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PAPER TRADE JOURNAL

Vol. XCVII AUGUST 24, 1933 No. 8

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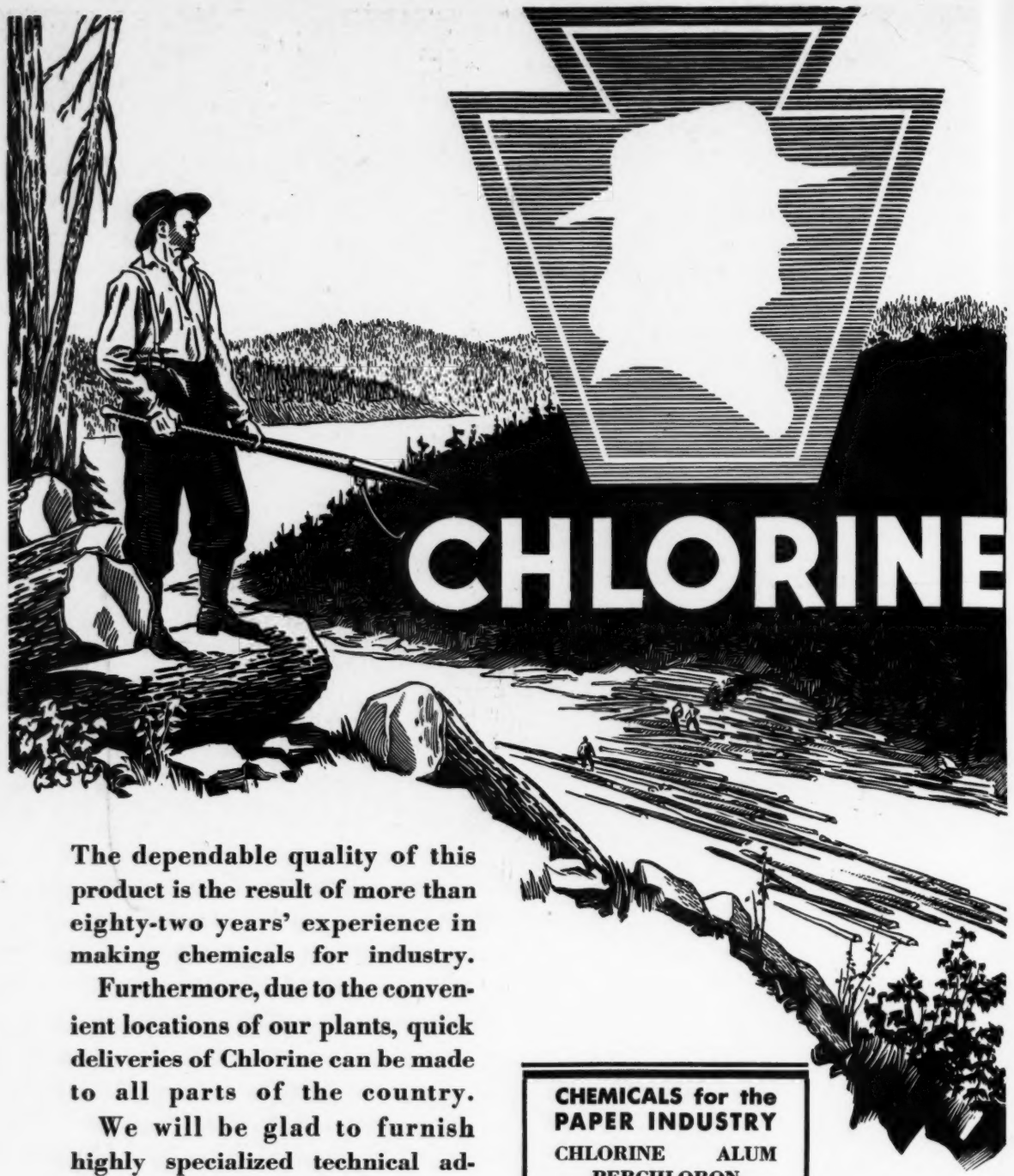

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PAPER TRADE JOURNAL

ESTABLISHED 1872

SIXTY-SECOND YEAR

THE INTERNATIONAL WEEKLY OF THE PAPER AND PULP INDUSTRY AND THE PIONEER PUBLICATION IN ITS FIELD

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PAPER TRADE JOURNAL

With Which Is Combined

PAPER

Vol. XCVII, No. 8 Thursday, August 24, 1933

Newsprint Hearing Scheduled for September 6

Deputy Administrator Pickard Will Preside—C. R. McMillen, Executive Vice President of the St. Regis Paper Co., New York, Is Appointed Industrial Advisor for the Paper Industry—Revised General Code for the Paper and Pulp Industry Eliminates the Clause Restricting the Installation of New Machinery—Kraft Manufacturers Meet

It has been officially announced that the public hearing on the newsprint paper code will be held on September 6 in the caucus room of the old House Office Building, Washington, D. C., before Deputy Administrator Pickard in charge of the paper industry for NRA. The official call is as follows:—

"The above industry, as represented by the Association of Newsprint Manufacturers of the United States, claiming to represent ninety-eight (98) percent of the productive capacity of Newsprint paper in the United States, has submitted a proposed code of Fair Competition, copies of which are available at the office of the National Recovery Administration, Room 4519, Department of Commerce, Washington, D. C.

"The Code for the Newsprint Industry in its present form merely reflects the proposals of the above mentioned industry, and none of the provisions contained therein are to be regarded as having received the approval of the National Recovery Administration as applying to this Industry.

"*Notice is hereby given* that a Public Hearing on this Code will be conducted by the Administrator, beginning at 10:00 A. M., Wednesday, September 6, 1933, in the Caucus Room, Old House Office Building, Washington, D. C., and continuing until completed. An opportunity to be heard (either in person or by duly appointed representatives either by appearance or by sending a written or telegraphic statement) will be given to persons or groups who can show a substantial interest as workers, employers, consumers or otherwise, in the effect of any provision of the proposed code.

"Those wishing to be heard must comply with the following simple requirements:

"(1) A written or telegraphic request for an opportunity to be heard must be filed before noon on Tuesday, September 5, 1933, with the Administrator, Room 4221, Department of Commerce, Washington, D. C.

"(2) Such request shall state the name of (a) any person seeking to testify in the hearing, and (b) the persons or groups whom he represents.

"(3) Such request shall contain a statement setting forth without argument, a proposal: (1) for the elimination of a specific provision of the Code; or (2) a modification of a specific provision, in the language proposed by the witness; or (3) a provision to be added to the Code, in language proposed by the witness.

"(4) At the Public Hearings, all persons are regarded as witnesses, and shall present orally facts only and not argument. Written briefs or arguments may be filed, but oral presentations will be confined to factual statements only.

"(5) In the discretion of the Deputy Administrator in charge of the Hearing, persons who have not complied with the requirements of paragraph (1), above, may be permitted at any time prior to the close of the Hearing to file written statements containing proposals for elimination from, modifications of, or additions to the code supported by pertinent information or argument. Such written statements must be condensed as much as possible.

"Public Hearings are solely for the purpose of obtaining in the most direct manner the facts useful to the Administrator, and no arguments will be heard or considered at this time. Representation of interested parties by attorneys or specialists is permissible, but it is not to be regarded as necessary. Industry, workers and the consuming public will be represented by special advisers employed by the Government."

HUGH S. JOHNSON.

C. R. McMillen Paper Advisor

E. R. Stittinius, Jr., liaison officer between the Industrial Advisory Board and the National Recovery Administration has announced the appointment of C. R. McMillen as industrial advisor for the paper industry.

Mr. McMillen who has a background of many years experience in the paper industry is executive vice president of the St. Regis Paper Company of New York City.

(Continued on page 49)

More Paper Concerns Support Recovery Act

Representative Paper and Pulp Manufacturers Are Complying With President's Wishes by Increasing Wages and Shortening Working Hours—Rhinelander Paper Co. Adds 100 Employees and Adopts 4 Six-Hour Shifts to Make 36 Hour Week

Announcements of wage increases and reduced hours, to conform with the National Industrial Recovery Act, continue to pour in from members of the paper industry. In addition to those reported in previous issues of the PAPER TRADE JOURNAL, many more representative paper concerns have expressed their intention to comply with the President's wishes, including the following:

Rhinelander Paper Co.

The Rhinelander Paper Company, of Rhinelander, Wis., manufacturers of glassine and grease proof papers, announces that on August 1st their company adopted a new hour and wage plan.

Under the new plan they have increased the number of employees by approximately one hundred men. In their continuous operating departments they have adopted the four six-hour shift or thirty-six hour week plan. This move on the company's part reduces the employees' working time from forty-eight hours to thirty-six hours a week. The same weekly wage will be paid for thirty-six hours as for forty-eight, which means an increase of 33 1/3 per cent on the hourly rate.

Day workers formerly working forty-eight hours are now on the forty hour week plan with an increase of 20 per cent on the hourly rate.

The management of the Rhinelander Paper Company feels that the four six-hour shift plan is the most practical for continuous operations like the paper manufacturing business. Under this plan each crew maintains its identity intact, whereas, under the forty hour week plan for shift workers a staggering of the crews must be worked out and this reduces efficiency.

Central Paper Co.

In carrying out the spirit of the National Industrial Recovery Act, the Central Paper Company, Menasha, Wis., a converting plant, has added ten employees and has announced a wage increase of 12½ per cent to all workers affected. The plant will hereafter be operated on a 40-hour week basis. The company now has 39 employees, the largest number it has ever had on the pay roll. These arrangements are temporary, pending adoption of the paper code.

Kimberly-Clark Corp.

Office hours of the Kimberly-Clark Corporation, Neenah, Wis., have been changed so employees can come under the NRA status. Employees will be on duty from 8:00 a.m. to 4:00 p. m. except on Saturdays, when they will work from 8:00 to 12:00 noon.

Schmidt & Ault Paper Co.

Effective July 31, the Schmidt & Ault Paper Company, of York, Pa., voluntarily adjusted their operations to comply with the provisions of the General Code of Fair Competition, submitted for the paper industry by the American Paper and Pulp Association. The company are operating a five-day producing week or 120 hours, with three shifts of 40 hours each.

As soon as the company learned that the Administrator had given permission to paper mills to sign the President's Agreement, substituting the labor provisions of the paper and pulp code for those contained in the blanket code, they signed. At the same time they signed the certificate of compliance. As a result, the Schmidt & Ault Paper Company are now full fledged members of the NRA, complying 100 per cent with the general code.

Milton Leather Board Co.

Superintendent M. J. Guild announces that the Milton Leather Board Company, of Milton, N. H., has increased wages 25 per cent with a minimum wage of 40 cents an hour. The mill has been put on a 120 hour a week schedule, operating three 8-hour shifts and increasing the number of employees by about 25 per cent. The men are now getting as much per week on the eight-hour schedule as they were previously getting for ten and twelve hours.

Menasha Mill Supply Co.

A 40-hour week with an 8-hour day schedule has been adopted by the Menasha Mill Supply Company, waste paper jobbers, at Menasha, Wis. Wages will be increased for both men and women, and the latter will receive as much for the 40-hour week as they did previously for the longer week. About thirty workers are affected by the changes adopted under the temporary code of the National Association of Waste Material Dealers.

Androscoggin Pulp Co.

The Androscoggin Pulp Company of South Windham, Me., has raised the pay of employees throughout the plant, four shifts have been placed in operation in the grinder room and more men have been added to the repair crew. Manager W. W. Jenkins said in announcing that the company would conform with the National Recovery Act. The 40-hour week is in effect in several departments of the plant and the entire force will be on this schedule in the near future.

Awards for Government Paper

[FROM OUR REGULAR CORRESPONDENT]

WASHINGTON, D. C., August 23, 1933.—The Government Printing Office has announced the following paper awards:

Barton, Duer & Koch Paper Company will furnish 10,000 pounds of salmon calendered tag board in 23¼ inch rolls at 7 cents per pound, bids for which were received on July 31.

The Mathers-Lamm Paper Company will furnish 396 pounds (2,000 sheets) of 28x42—198, golden rod book paper at .01169 cents per pound and the R. P. Andrews Paper Company will furnish 6,000 pounds (720 sheets) of No. 1 quality binders board at .$37925 cents per pound. Bids for both of these items were received on July 26.

The R. P. Andrews Paper Company will also furnish 165 pounds (1,200 sheets) of 75 per cent rag 24x38—137, green ledger paper at $28.77 per ream, bids for which were received on July 12.

Walker-Goulard-Plehn Company will furnish 2,000 pounds of No. 1 gummed kraft paper in 24 inch rolls at 7.75 cents per pound, bids for which were received on July 5.

National Recovery Act Discussed in Canada

Belief Expressed That New Code Drawn Up by U. S. Manufacturers of News Print Paper Will Have Like Bearing Upon Operations in British Dominion—Government May be Requested to Take Action Regarding Prices and Trade Practices

[FROM OUR REGULAR CORRESPONDENT]

MONTREAL, Que., August 21, 1933—The view prevails here that the new code drawn up by United States manufacturers of news print under the terms of the National Recovery Act will have like bearing upon operations in this country if it is approved in its present form. It is held that the elimination of the sections in the original draft dealing with minimum prices and trade practices makes the revised code of purely domestic interest.

On the part of some prominent in the industry, there is a disposition here to call upon the Dominion Government to take action in regard to prices and trade practices, but as this would involve a delicate situation in view of the international character of the industry and the international character of the ownership of mills here, the belief is expressed that negotiations between Washington and Ottawa would be a necessary preliminary to such action.

L. J. Belnap in Favor of Intervention

Among those who favor government intervention is L. J. Belnap, president of Consolidated Paper Corporation. He says the Dominion Government, which must be seriously concerned in the chaotic conditions that have prevailed for so long in one of its major industries, has on its hands an effective weapon, which could be used to stop the terrible waste of natural resources involved in the situation. This weapon, he believed, consisted of the right to license news print exports, thus permitting it, in the event of a complaint that one Canadian exporter was selling below cost to the detriment of other Canadian mills and the industry as a whole, the export license of the offending organization could be suspended for a term.

In support of his remarks, Mr. Belnap declares that there is no apparent change for the better in the unhealthy price situation in the industry. Several operators, he said, were still quoting prices below the established level in order to obtain tonnage, while special discounts and other devices were also being used in efforts to land contracts. No evidence can be seen of any disposition on the part of recalcitrant producers to get together in an effort to stabilize the price level in the industry, and the acceptance and enforcement of a news print code by the industry in the United States covering price and trade practices seems the only means by which stabilization is at all likely to be effected.

Returns showing that production of news print by Canadian mills was sharply higher in July than in the same month last year, the increase amounting to 26.6 per cent afford like gratification to Mr. Belnap. He pointed to the fact that value of news print exports from all Canadian mills in July, despite the increase in production and shipments was actually $8,000 lower than for July, 1932, as indicating the effect of the low price levels now prevailing in the industry, and drew the obvious conclusion the increase in production is not helping the news print companies any insofar as revenues and earnings are concerned.

Quebec Stumpage Dues

Hon. Honore Mercier, Minister of Lands and Forests for Quebec, states that the Quebec Government will shortly consider a proposal to reduce stumpage dues and rental of timber areas in the province of Quebec.

A reduction is proposed for a two-fold purpose, in order to help Quebec's lumber industry; second, in order to encourage the companies leasing Crown lands for timber-cutting to make this coming season's cut as large as that of last year, if not larger, in order to give employment to a greater number of lumberjacks in the province's north-woods lumber camps this fall.

The fixed stumpage fee of the Department of Lands and Forests, it is known, is set at $2.70 per 1,000 feet board measure, while that of the timber area rental fee is set at $8 per square mile. Last year, the Quebec Government by order of the Lieutenant-Governor-in-Council, reduced the stumpage fees to $2 per 1,000 feet board measure of lumber. Two years ago, timber area rental fees were reducd to $3 per square mile, while last year they were set at $5 per square mile.

Pulp and Paper Products in Mexico

H. L. Brown, Assistant Trade Commissioner for Canada in Mexico, has been investigating the Mexican market for pulp and paper products, and he writes: "Canadian pulp and paper manufacturers have, with a few exceptions, not shown any great interest in the Mexican market in recent years. Some years ago small amounts of Canadian pulp were imported into Mexico and found quite satisfactory as to quality, but recent price conditions have practically excluded Canada from this market. Similarly, Canada has supplied small but decreasing amount of fine papers. It cannot be said that, at the present time, there exists any really worthwhile opportunities in pulp or paper. In pulp, however, as soon as world prices become steadier, the Mexican market should prove attractive."

Boston Paper Market Quiet

[FROM OUR REGULAR CORRESPONDENT]

BOSTON, Mass., August 21, 1933.—The wholesale paper market was rather quiet as a whole, during the week, with sales being made here and there. There is more or less uncertainty in regard to prices, but a general feeling of confidence prevails that business will be better in September after the August lull is over and the working of the code is under way. Manufacturers and wholesalers of fine paper are looking forward hopefully to new orders, and in the meantime a certain amount of business is placed for bonds, ledgers, writings and book papers. In some quarters, at least, the volume of sales of box coverings has held up during August a little ahead of that for the same month in 1932.

There was a further let-down in activity of wrapping paper and summer specialties, although the trade is anticipating a comeback in kraft in September. The box board market has been largely marking time for the last two weeks, except for the demand for material for making shoe boxes. A general revival is expected in September. The paper stock market was fairly easy, and did not advance in sympathy with the New York market. Values of old papers are holding however, with some activity. The bagging market is rather slack. There was slightly more activity in roofing rags. Business in twine was good, but high prices have caused sales to slow up considerably.

Chicago Paper Market Generally Marks Time

Local Distributors of Paper Taking Stock of Position and Preparing Anew for Autumn Business—Demand for Various Standard Grades of Paper Well Sustained, With Prices Firm —Some Improvement Noticed in Coarse Wrapping Paper Section

[FROM OUR REGULAR CORRESPONDENT]

CHICAGO, Ill., August 21, 1933—With the paper industry in this locality disposing of its contribution to the code provisions, representatives are turning to the important matter of obtaining the fullest measure of benefit from general improvement. Markets, locally, marked time, for the most part, during the week. In some instances, such as in the kraft and allied markets, slight increases in strength were reported. The prevalent sentiment was that paper, as well as other commodities, was taking stock of its position and preparing anew for fall business. Reports indicated no particular scarcity of business, demand holding up well and markets firm. The speedy rush of a few weeks ago was reported absent, however.

Fine paper markets were firm, with a healthy demand reported in most lines. Sulphite bonds retained steadiness, while books and covers also retained earlier gains. Bonds and ledgers showed no evidence of relinquishing some hard earned advantages. The board market showed fair progress. Ground woods were reported as virtually unchanged, demand holding firm but no particular price strengthening in evidence as yet. News print reports were similar. The waste market indicated renewed buying and gave strong testimony to the general improvement in the local paper industry.

Plans for Paper Day

Chicago directors of the Paper Foundation, Inc., are meeting in Chicago early next week to complete plans for observance of Paper Day, scheduled for September 1 in conjunction with the paper exhibit at A Century of Progress Exposition. The directors, and associations they represent, are as follows: W. N. Gillett, Western Paper Merchants Association; H. R. Knott, Salesmen's Association of the Paper Industry; D. F. Peck, the Chicago Paper Association, and Phil A. Howard, managing director of the Foundation.

The Foundation arranged a splendidly publicized event on Saturday, August 19, when the "mile of paper" used for signatures in request of a return to the 2 cent postal rate, took the fifty thousandth signature. Number 50,000 was arranged by the hard working Foundation committee to be a beautiful girl who attractively adorned the newspaper photographs of the event. In return for her favor, she was presented with a special box of stationery manufactured and donated by the Hawthorne Paper Company. Phil Howard made the presentation for the Foundation. The event naturally received a lot of attention and brought the already popular paper exhibit more into the limelight.

The paper industry has received thousands of lines of editorial comment from the Chicago press, each special edition of the various newspapers calling attention to the paper making machine, the House of Paper, the many individual exhibits, etc. The Foundation hopes to cash in on this publicity on September 1, Paper Day.

Chicago Paper Association Activities

Aggressive efforts are being made by the Chicago Paper Association to expand its membership so that the entire coarse paper industry in Chicago may work together under an effective unit and under NRA provisions. At the last meeting of the association, President Walter Schulman appointed a committee of five members to give thorough study to an expansion program. This committee was composed of William Chukerman, Leo S. Altholz, James F. Danehy, D. F. Peck and M. A. McNulty.

On August 14 the group met at the Illinois Athletic Club, spending nearly the entire afternoon carefully going over a suggested program and reporting fully on preliminary efforts to interest non-members of the association in acquiring memberships. The contact made with non-members in an effort to get them to adhere to merchandising policies subscribed to by the Association were reported as highly favorable.

Meanwhile the "code committee," headed by Mr. Altholz and Mr. Danehy, has completed its work, recommendations covering the coarse paper industry here having been forwarded to the National Paper Trade Association. Local markets, according to Chicago coarse paper jobbers and retailers, are exceedingly strong. The kraft price of 3.62 and a fraction is the high for the "new deal" and allied markets are running decidedly strong, say reports.

Salesmen Hold Big Golf Event

What was planned as an ordinary event on the calendar of the Middle West Division, Salesmen's Association of the Paper Industry, turned out to be one of the biggest golf and outing events the enterprising organization has yet sponsored. Nearly seventy, a record breaking crowd, attended the August golfing event at Knollwood on Friday, August 18. The bulk of those present got out in time for the luncheon at noon. Those who didn't play golf got a chance to enjoy the Knollwood swimming pool and other recreational facilities. The entire affair was much to the credit of Bill Tilden, demon golf chairman, who got out a crowd that future chairmen will find it hard to beat.

The prize winners were as follows: Low net, handicap 17 and under, Courtney Reeves, Allied Paper Company; Low net, 18 and up, E. B. Shaeffer, Missiquoi Pulp and Paper; low net foresome, H. F. Leahy, LaSalle Paper Company, Harold Knott and Bill Tilden, of Eastern Manufacturing Company, and W. G. Herpich, Swift & Co.; low putts foresome, P. J. Gallagher and L. H. Donahue, Marquette Paper Company and D. W. Bergstrom and Bert Fisher, Bergstrom Paper Company; Low putts, Joe Pirie, Nekoosa-Edwards; blind bogey, Harold Leahy; low net first 9, E. E. Long, Horders; low net second nine, R. C. Cook, International Paper Company; low score par 3 holes, D. W. Bergstrom, and high gross, George Morns, International Paper Company. A special prize of a dozen golf balls, donated by Warren Moore, was won by a guest, D. R. Thomas, assistant general manager of the General Paper and Cartage Company, Pittsburgh.

Paper Price Index Higher

[FROM OUR REGULAR CORRESPONDENT]

WASHINGTON, D. C., August 23, 1933.—July wholesale price index number for paper and pulp was 78.1 compared with 73.5 for June and 76.2 for July of last year taking 1926 at 100 according to the Bureau of Labor Statistics, Department of Labor.

Philadelphia Paper Market Continues Active

Demand for Various Standard Grades of Fine Paper Encouraging, Although Seasonally Quiet—Increased Request Experienced for Coarse Wrapping Paper, With Quotations Firmly Maintained—Price Cutting in Both Divisions Virtually Ceases

[FROM OUR REGULAR CORRESPONDENT]

PHILADELPHIA, Pa., August 21, 1933—Activities in the Philadelphia paper market have steadily, and in some respects actively continued during this ordinarily dull mid-August period. These activities were two-fold: primarily to further the ends sought by the Government in the NRA; secondarily, actual business. While the first claimed the major attention of executives, there was enough to keep salesmen engaged working under the Blanket Code pending the confirmation by the Government of the Paper Code.

In this matter of the Codes, Philadelphia was a little disappointed that one of its paper house executives was not among the seven to be appointed in connection with three officials of the Government to administer the Code, but it rejoices in the fact that it is in the geographical region from which the president of the National Paper Trade Association will officiate; and moreover since he comes from Atlanta, that Philadelphia will be on a parity with the two particular centers of Atlantic Coast paper interests, which are their normal trade competitors.

In the fine paper trade, business while quiet was at least encouraging. While the sales force has thus far not felt a large measure of betterment through the Code, save in some shortening of hours, packers, teamsters, and other manual employees have been benefited, and quite a number of additional hands have been given employment. One of the largest distributors, both of coarse and fine papers and allied lines has increased its payroll in its seven departments by approximately $1,000 a month. Settlement of labor trouble has been reflected in increased purchase of coarse papers with prices not only advanced but firmly maintained all along the line. Price cutting in either fine or coarse papers has now virtually ceased.

The story of the week in the paper stock trade absolutely repeats that of the preceding like period. Outside prices still maintain; the volume of stock coming in shows no increase and mill demand continues with sufficient force to take packings just as fast as they can be provided.

Sentiment among the fine paper distributors is crystallizing on the proposition of establishing in Philadelphia a permanent headquarters with an executive in charge to look after the many details involved in the business under the New Deal and the NRA Code.

Thought on this subject has gone so far that a number of the representative houses will go into conference this week for the purpose of discussing the advisability of setting up a paper trade headquarters and a ways and means for financing. Such an organization, of course, will come at a most appropriate time because, with the accession of the Paper House of Pennsylvania and the Atlantic Paper Company, the fine paper trade is now 100 per cent organized and harmonious—a striking contrast to the condition of affairs a quarter century ago when through the instrumentality of a representative of the PAPER TRADE JOURNAL the first get-together meeting was held in the Bourse.

Meanwhile, there was held during the week the first 100 per cent representative meeting of the Wholesale Packers of Paper Stock in Philadelphia history. When President Kinney called together the meeting in the Hotel Lorraine, there was not one absentee. The primary purpose of the meeting was to consider what course should be taken with regard to the NRA Code. William J. McGarity, returned from the meeting of the National Waste Material Dealers' Association in Chicago, described in detail the Code adopted there and submitted to the Government. While there was some discussion of three other Codes which have been drawn up by various interests, action was unanimous in favoring the Code of the National Waste Material Dealers' Association, and consideration of it by the Government is momentarily expected.

The Coarse Paper Division of the Philadelphia Paper Trade Association seems destined in the near future to receive a very large accession to its ranks. It will be recalled that in these columns it was reported that the coarse paper field was now completely represented in the Coarse Paper Division. There are a number of closely allied lines, however, which for sometime past have been maintaining the Paper and Bag Institute. Meeting in the Broad-Wood Hotel on Tuesday evening last, where approximately ninety representatives were present, unanimous approval was given to the proposition to join with the Philadelphia Paper Trade Association as a Paper and Bag Division, or Institute. Approximately twenty-five of those present announced that they had indicated their desire to join the Paper Trade Association and are awaiting the result of their applications. The guest speaker of the evening was E. J. Melia, who spoke on the value of co-operative effort and particularly of the opportunities, obligations and benefits from the NRA. He was introduced by Charles Resnick, chairman of the Group, who also presented Simon Walter, Nathan D. Isen, William Starke and H. J. Hogg. Arthur H. Lewis, secretary, announces that the next meeting will be on Tuesday, August 29, at which time they hope to have a 100 per cent membership of the Institute associated with the Paper Trade Association of Philadelphia and the National Paper Trade Association.

Co-operation for mutual benefit was the keynote of the pleas made and the responses given by the Baltimore Paper Trade Association, which on Tuesday last entertained President William A. Hentz, Edward A. Keller and George Weaver, the two latter connected with the Garrett-Buchanan Company. Mr. Hentz expressed himself delighted with the cordiality of the reception given and is confident that as a result of the personal contacts made, discussion of certain aspects of business mutually beneficial will progress with a much clearer understanding between Baltimore and Philadelphia than was possible under prior conditions of written correspondence.

Moore & White have installed a new 4-drum winder for New York and Pennsylvania Company (Lock Haven Mill) Lock Haven, Pa., for a 150-inch trim paper machine. Also at the Consolidated Paper Company there is being installed a Moore & White 4-drum large roll winder for a 72-inch trim machine.

Moore & White have completed the reconditioning of a machine for the Container Corporation, in the board mill, so that they are now able to operate their No. 2 machine, this machine having been idle for three or four years.

Efforts to Stabilize Paper Industry in Canada

Premier Bennett, Secretary of State Hull, and Lord Rothermere Reported to Have Paved Way for Some Quota Arrangement to Enable Orderly Marketing of Canadian News Print in U. S.—Conversations Held in London Recently

[FROM OUR REGULAR CORRESPONDENT]

TORONTO, Ont., August 21, 1933—Continuance of efforts on the part of industry itself and of the Federal Government to bring some order out of chaos into which the news print manufacturers have been thrown has come to a head in an interesting rumor reaching Toronto to the effect that Premier Bennett has, as the result of conversation in London with Cordell Hull, Secretary of State for the United States, and with Lord Rothermere, paved the way for some quota arrangement which would enable the orderly marketing in the United States of the product of the Canadian mills.

It is known that the American news print manufacturers have been desirous of using the NRA scheme to bring their production up to the 100 per cent mark, but this could only be accomplished by imposing a heavy import duty against all news print from Canada coming in under the $55 price. The imposition of any such duty would be strongly opposed by some American newspapers that have long contracts with Canadian mills or that have their own plants in Canada, such as the *New York Times* and the *Chicago Tribune*. Until the return of Premier Bennett early in September any confirmation of the rumor about the discovery of a way out for the Canadian mills is obviously impossible but it is believed in news print and Government circles that some such move is about to be made.

New Superintendent for Lincoln

A. J. Nadeau, who for the past several years has been superintendent of the Lincoln mill of Alliance Paper Mills, Ltd., in the St. Catharines district, has resigned his position. Following out their policy of training and developing men within the mill's personnel, Alliance has promoted Wilfrid Turner to the vacancy. Mr. Turner has been with the company for some years and with his background of technical and general training it is considered that he is well qualified to take charge of the mill and to superintend the manufacture of high grade rope and tag specialties which are being developed at the Lincoln Division. George W. Paulin, managing director of Alliance, in making the announcement of the change, said that a good demand for the specialties being turned out by the mill was being experienced and that business generally in the various mills of the company was beginning to show marked improvement.

Revised Code Not Effective in Canada

The news print code, in its revised form in the United States, has little bearing in Canada, according to the statement of a well-known news print manufacturer. The elimination of the sections dealing with minimum prices for news print and trade practices makes the revised code of purely domestic interest. It is pointed out that the original code drawn up by the American producers had a section dealing with imports and their effect upon operations of the industry. Section E of the Act provides that the President could take action to impose a duty, ban, or otherwise limit or prohibit imports, if such were in sufficient quantity or on terms such as to nullify the provisions of the adopted code. This section was all important to the manufacturers in Canada as it meant that Canadian companies would have to adhere closely to the terms of the United States code if they were to maintain their position in the American market. There was talk of forming an organization in Canada similar to the United States Newsprint Manufacturers' Association, or to license exports so that the industry here would not be penalized through non-adherence to the American regulations. Such action is not necessary at this time as the new code is bare of any reference to imports.

Notes and Jottings of the Trade

E. H. Wilkinson & Co., Ltd., paper mill representatives, Melinda street, Toronto, has taken over the Canadian representation of Backhouse & Coppock, Ltd., manufacturers of coated papers and boards, London, England, with mills at Macclesfield. Backhouse & Coppock are one of the Inverness group of paper manufacturers.

The death took place at Sparrow Lake, Ont., a few days ago, of Herbert Breckinridge, of Toronto, widely known in the Canadian paper trade. The late Mr. Breckinridge was for many years secretary-treasurer of Dominion Envelope and Cartons, Ltd., Toronto, having been connected with the organization since its formation. He had been in poor health for some time and latterly had been compelled to forego active participation in the administration of the company.

J. R. Leslie, secretary-treasurer of Alliance Paper Mills, Ltd., is spending his vacation at Algonquin Park, Ont. C. S. Taylor, of the same company, has returned from a holiday stay at Southampton.

Norman E. Wainwright, president of Don Valley Paper Mills, Ltd., Toronto, has returned after spending a few weeks' vacation in the Maritime Provinces.

Ivan Moffat, secretary of the Canadian Paper Trade Association, Toronto, is spending his vacation on Lake Rosseau in the Muskoka region.

More pulpwood was shipped out of Peterborough, Victoria and Haliburton counties in Ontario during July than at any period of the year. It was four times the amount shipped in July of last year. All this pulpwood, local records show, was exported to the United States, and good prices were obtained for it since it was contracted for in 1930 and 1931 at prices then prevailing. This pulpwood is used in the production of some of the leading magazines and periodicals in the United States.

Windstorm Damages Marathon Plant

[FROM OUR REGULAR CORRESPONDENT]

APPLETON, Wis., August 21, 1933—Damage caused by windstorms and rain to the buildings of the Marathon Paper Mills Company, Rothschild, Wis., is being repaired. The total loss estimated by the company is $5,000, of which $2,000 is damage to paper rolls and stacks soaked by water. The automatic sprinkler system went into operation when wind tore off a portion of the mill roof, adding considerably to the damage. The roof of the coal conveyor was torn off, and the carrier was disabled. A heavy plank torn from a digester was carried to a warehouse 500 feet away and driven through the roof. Water that seeped down into the shipping room in the basement stood four inches deep. The paper machines were down for only a few hours when switches were put out of commission.

General Code of Fair Competition for the Paper and Pulp Industry

The following is the revised General Paper Code as of August 15, 1933:

To effectuate the policies of Title I of the National Industry Recovery Act the following is hereby established as a Code of Fair Competition for the paper, paperboard and pulp industry.

Article I—Definitions

1. Where used in this Code and in all Codes subordinate hereto the following definitions shall apply:

"Industry"—The manufacture in the United States of all paper, paperboard and pulp (except such classes or kinds thereof as are mentioned in Schedule A hereof) and the conversion of paper, and paperboard into such products as are specifically mentioned in Schedule B hereof.

"Member"—A person engaged in such industry.

"Division"—A division or section of the industry recognized as such by this Code.

"Act"—Title I of the National Industrial Recovery Act.

"Administration"—The National Industrial Recovery Administration.

"Administrator"—The National Industrial Recovery Administrator.

"Person"—Includes natural persons, partnerships, associations, corporations, trustees, trustees in bankruptcy and receivers.

Article II—Organization

1. The Executive Committee of the American Paper and Pulp Association is hereby designated as the Agency for administering the provisions of this Code and is hereby named and is hereinafter referred to as "The Paper Industry Authority". The Administrator may designate one or more persons as additional advisory members thereof.

2. The Industry is hereby divided into divisions as set forth in Schedule B hereto attached. Any questions as to the division into which any particular class or kind of paper, pulp or paperboard or any product of conversion thereof may fall shall be determined by the Paper Industry Authority. If and when the American Paper and Pulp Association shall admit to membership any association made up of manufacture of any product or products which do not fall within any division of the industry then established, the Paper Industry Authority may create a new division to include such product or products and such association may then adopt and submit a divisional code as provided in Article III hereof.

3. In each division there may be one divisional association to which every member of the industry engaged in the manufacture of any product included in such division shall be eligible for membership.

Article III—Divisional Codes

1. Each such divisional association may adopt a divisional Code and may submit the same, through the American Paper and Pulp Association for approval under the Act.

2. Such divisional Codes shall be subordinate to this Code and shall specifically recognize this Code as applicable to all members of the Industry engaged in manufacturing products falling within the division for which such divisional Code is submitted.

3. Each such divisional Code shall designate an agency for the purpose of administering such divisional Code which shall be determined "The Executive Authority" of such division.

4. Such divisional Codes may contain such provisions relating to said division as may be appropriate for inclusion in a Code of Fair Competition under the Act provided that no such Code shall contain any provision contrary to or inconsistent with the provisions of this Code.

Article IV—Employment—Hourly Basis

1. The provisions of this Article shall apply to mill, factory and mechanical workers and artisans.

2. No such employee except employees regularly engaged in a supervisory capacity shall be required or permitted to work more than eight hours in any one day or more than 160 hours in any period of four consecutive weeks *except* that longer hours may be worked.

(a) By all employees engaged in emergency repair work and when necessary to protest property in case of fire or flood or other natural hazard;

(b) In continuous process operations, by machine crews at the end of a machine run (and while the machinery is not running) in wash-ups, changing wires and machine clothing and otherwise preparing for the succeeding run; and by highly skilled operators where cessation of operations at the end of their tours would result in serious loss or would deprive other workers of employment.

3. At the end of each calendar month every member shall report to the Paper Industry Authority, in such detail as may be required by it the number of man-hours worked in that month under the foregoing exceptions and the ratio which said man-hours bears to the total number of man-hours of labor of the same class during said month.

4. The minimum rates of wages which shall be paid to any of such employees shall be as follows:

(a) Northern Zone, which shall consist of all of the territory of the United States except the States named in subdivisions (b) and (c).

Male labor 35 cents per hour.

Female labor 30 cents per hour.

(b) Central Zone, which shall consist of the States of Delaware, Maryland, Virginia, West Virginia, Kentucky, Tennessee and North Carolina, and the District of Columbia.

Male labor 32½ cents per hour.

Female labor 27½ cents per hour.

(c) Southern Zone, which shall consist of the States of South Carolina, Georgia, Florida, Alabama, Mississippi, Louisiana, Arkansas and Texas.

Male labor 30 cents per hour.

Female labor 25 cents per hour.

Provided, however, that in case the rate per hour for the same class of labor was on July 15th, 1929 less than such minimum rates, the rate per hour paid shall be not less than the rate per hour paid on July 15, 1929, but in no event shall the rate per hour be less than twenty-five (25c) cents per hour.

5. Apprentices and learners during an apprenticeship of not to exceed six (6) weeks may be paid not less than eighty (80%) per cent of such minimum rates.

6. Piece-workers shall be paid at rates which will guar-

antee them wages for an hour's work which shall not be less than such minimum rates.

Article V—Employment—Weekly Basis

1. The provisions of this Article shall apply to employees not covered by Article IV.

2. No such employees, except executives and supervisory employees and traveling and commission sales people, shall be required or permitted to work more than 40 hours in any one week except that additional hours may be worked during periods of peak loads.

3. At the end of each calendar month every member shall report to the Paper Industry Authority, in such detail as may be required by it, the number of man hours worked in that month under the foregoing exception and the ratio which said man hours bears to the total number of man hours of labor of the same class during said month.

4. The minimum rates of wages which shall be paid to all such employees shall be as follows:—

Not less than $15 per week in any city of over 500,000 population, nor less than $14.50 per week in any city between 250,000 and 500,000 population, nor less than $14 per week in any city between 2,500 and 250,000 population, nor less than $12 per week in towns of less than 2,500 population. Provided, however, that office boys or girls may be paid not less than 80 per cent of such minimum wage; and the number of such office boys or girls shall not exceed 5 per cent of the total number of employees covered by the provisions of this paragraph.

5. Wages for parts of weeks shall be proportionate to the wage for an entire week.

Article VI—Employment General

1. No person under sixteen years of age shall be employed.

2. No person shall knowingly be employed by more than one employer for an aggregate number of hours in excess of the maximum number prescribed by this Code.

3. The wage rates of all employees receiving more than the minimum rates herein prescribed shall be equitably adjusted and within ninety (90) days after the effective date hereof, the Paper Industry Authority shall report to the Administrator the action taken by all members of the industry in making such adjustment.

4. The minimum wages hereby prescribed shall not in any way be considered as a discrimination by reason of sex and where in any case women do substantially the same work or perform substantially the same duties as men they shall receive the same rate of wages as men receive for doing such work or performing such duties.

5. Employees shall have the right to organize and bargain collectively through representatives of their own choosing, and shall be free from the interference, restraint, or coercion of employers of labor, or their agents, in the designation of such representatives or in self-organization or in other concerted activities for the purpose of collective bargaining or other mutual aid or protection. No employee and no one seeking employment shall be required as a condition of employment to join any company union or to refrain from joining, organizing, or assisting a labor organization of his own choosing. Employers shall comply with the maximum hours of labor, minimum rates of pay, and other conditions of employment approved or prescribed by the President.

Article VII—Accounting—Selling

1. The Paper Industry Authority shall, as soon as practicable prescribe a standard method of accounting and costing for the industry and thereafter every member shall use an accounting and costing system which conforms to the principles of, and is at least as detailed and complete as, such standard method.

2. Except in performance of bona fide contracts in existence on the effective date of this Code, no member shall in any quarter of the calendar year sell any product of his manufacture at a price or upon such terms or conditions as will result in the purchaser paying for the goods received less than the weighted average cost of such product to the industry during the second preceding quarter; provided, however, that discontinued lines and damaged goods or seconds may be disposed of in such manner and on such terms and conditions as the Executive Authority of the division into which such products fall may approve subject to the approval of the Paper Industry Authority, and as are necessary to move such products into buyers' hands.

The weighted average cost to the industry of any product of the industry shall be determined for each quarter by the Executive Authority of the division of the industry into which such product falls provided that such determination shall be approved by the PIA. After the standard method of costing has been determined by the PIA such weighted average cost shall be determined in accordance with such standard method, and until then, it shall be determined by estimate by such Executive Authority approved by the PIA.

3. Each member shall, on or before the effective date of this code, publish and file with the Executive Authority of his division or divisions complete lists or schedules of prices and terms and conditions of sale (including all differentials, discounts, trade allowances and special charges) of all products falling within the scope of the division offered for sale by such member, and shall so publish and file all subsequent changes therein or revisions thereof at least 24 hours prior to the effective date of any such changes or revisions. The Executive Authority shall send to the Paper Industry Authority and to each member of the division a copy of such price lists or schedules and terms and conditions of sale, and changes or revisions thereof as so filed.

4. Except in fulfilment of bona fide contracts existing on the effective date of this code, no member of the industry shall sell any such products at a price or prices lower than or upon terms and conditions more favorable than stated in his price list, published as hereinbefore provided.

5. Bona fide export sales shall be exempt from the provisions of sections 2 and 3 hereof.

Article VIII—Reports—Statistics

1. Each member shall prepare and file with the Paper Industry Authority at such times and in such manner as it may prescribe, statistics of plant capacity, volume of production, volume of sales in units and dollars, orders received, unfilled orders, stocks on hand, inventory both raw and finished, number of employees, wage rates, employee earnings, hours of work and such other data or information as the Paper Industry Authority or the Administrator may from time to time require. Any or all information furnished to the Paper Industry Authority by any member shall be subject to checking for the purpose of verification by an examination of the books and accounts and records of such member by any disinterested accountant or accountants or other qualified person or persons designated by the Paper Industry Authority.

2. Except as otherwise provided in the Act, all statistics, data and information filed in accordance with the provisions of Section 1 hereto shall be confidential and the statistics, data and information of one member shall not be revealed to another member. No such data or information shall be published except in combination with other

similar data and in such a manner as to avoid the disclosure of confidential information. The Paper Industry Authority shall arrange in such manner as it may determine for the publication, currently to members of each division, of the divisional totals of orders received, unfilled orders, shipments, stocks of finished goods on hand and production.

3. The Paper Industry Authority shall make to the Administration such reports as the Administrator may from time to time require.

Article IX—General Provisions

1. If any member is also a member of another industry, the provisions of the Code shall apply to and affect only that part of his business which is included in this industry and if the products of any member fall in more than one division of the industry the provisions of any divisional code shall apply to and affect said member only as to products falling in such division.

2. If any provision of this Code or of any divisional code is declared invalid or unenforcable, the remaining provisions shall, nevertheless, continue in full force and effect.

3. In the event that the divisional Associations or Executive Authorities of any two or more divisions shall be unable to agree on any matter or matters affecting such divisions, the Paper Industry Authority shall decide such matter, and its decisions, when approved by the Administrator, shall be binding on all concerned.

4. The Executive Authority of any division may formulate a complaint to the President of the United States, pursuant to the provisions of Subdivision (e) of Section 3 of the Act, that any paper, paperboard or pulp is being imported into the United States in substantial quantities or in increasing ratio to domestic production of any competitive paper, paperboard or pulp, and on such terms or under such conditions as to render ineffective or seriously to endanger the maintenance of this Code, or of any divisional code subordinate hereto and deliver the same to the Paper Industry Authority, which shall transmit such complaint to the President.

5. The Paper Industry Authority shall have power to investigate alleged violations of this Code and acts or courses of conduct by any member or divisional association which are or appear to be contrary to the policy of the Act or which tend or may tend to render ineffective this Code or any divisional code and to report the same with recommendations to the Administrator.

6. Any work or process incidental to and carried on by a member at his plant as a part of the manufacture of any product of the industry shall be governed by the provisions of this Code rather than of any other code.

7. Such of the provisions of this Code or of any divisional code as are not required to be included therein by the Act may, with the approval of the President of the United States, be modified or eliminated as changes in circumstances or experience may indicate. It is contemplated that from time to time supplementary provisions to this Code and to the divisional codes to prevent unfair competition in price and other unfair and destructive competitive practices, and to effectuate the other purposes and policies of the Act, will be submitted for the approval of the President.

8. This code shall become effective on the second Monday after the date upon which it shall be approved by the President of the United States.

9. This Code and each divisional code and all the provisions thereof are expressly made subject to the right of the President, in accordance with the provisions of Clause 10 (b) of the Act, from time to time to cancel or modify any order, approval, license, rule or regulation, issued under Title I of said Act, and specifically to the right of the President to cancel or modify his approval of such code or any conditions imposed by him upon his approval thereof.

Subordinate Code for the Writing Paper Manufacturers Association Division

The following is hereby established as the Subordinate Code of Fair Competition of the Writing Paper Manufacturers Association Division of the Paper, Paperboard and Pulp Industry.

Article I—Definitions

Words used herein are hereby defined as follows:

"General Code"—the general code of the Paper, Paperboard and Pulp Industry.

"This Division"—The Writing Paper Manufacturers Association Division of such industry as defined in Section 1 of Article II of the General Code.

"Executive Authority"—the body created by Section 1, of Article III hereof.

The definitions contained in Article I of the General Code apply also to this code.

Article II—Subordination

1. This Code is subordinate to the General Code and is submitted pursuant to the provisions of Section 4 of Article II of the General Code.

2. The General Code is hereby recognized as binding in this Division and all members of the industry included within this Division.

3. In the event that any provision of this Code shall be found to be inconsistent with the provisions of the General Code, the provisions of the General Code shall prevail.

Article III—Administration

1. There is hereby created a body to be known as the Executive Authority of the Writing Paper Division of the Paper Industry which shall consist of the Executive Committee and Industrial Control Committee of the Writing Paper Manufacturers Association, and of three members of the Paper Industry Authority designated by the Administrator pursuant to Section 2 of Article III of the General Code. The three members so designated shall have no vote.

2. The Executive Authority is charged generally with the Administration of this Code, and shall have such other powers and duties as are prescribed herein or in the General Code.

3. The Executive Authority shall cooperate with and assist the Paper Industry Authority in administering the General Code, and in obtaining from members within this Division such reports, statistics and other data as the Paper Industry Authority may require.

4. Subject to restrictions and safeguards similar to

those provided in Article VII of the General Code, members shall furnish such additional information to the Secretary as may from time to time be required by the Executive Authority.

Article IV—Trade Customs

The Executive Authority shall formulate the recognized Trade Customs and Fair Trade Practices of this Division, and may from time to time submit any such Trade Customs or Fair Trade Practices through the Paper Industry Authority to the Administrator for approval, and the same when approved shall have the same force and effect as if incorporated in this code.

Article V—Effective Date

This code shall become effective on the second Monday after the date upon which it shall be approved by the President of the United States.

Article VI—Application

This code in all of its provisions shall inure to the benefit of and be binding upon all producers of writing paper.

Article VII—Grades

This code shall cover the following grades of paper:

Adding Machine	Ledgers
Bible	Manifold
Blue Print	Manuscript Cover
Bonds	Map
Carbonizing Tissue	Meter
Chart	Mimeograph
Cigarette	Onion Skin
Condenser	Papeterie
Drafting	Parchment
Drawing	Photostat
Envelope	Rag Index Bristol
Flat Writings	Safety Paper and Base Stock
Folded Writings	Tablet
Hectograph or Duplicating	Tracing
Laid Writings	Typewriter
	Weddings and Bristols

Subordinate Code for the Cover Paper Manufacturers Association Division

The following is hereby established as the Subordinate Code of Fair Competition of the Cover Paper Manufacturers Association Division of the Paper, Paperboard and Pulp Industry.

Article I—Definitions

Words used herein are hereby defined as follows:
"General Code"—the general code of the Paper, Paperboard and Pulp Industry.
"This Division"—The Cover Paper Division of such industry as defined in Section 1 of Article II of the General Code.
"Executive Authority"—the body created by Section 1, of Article III hereof.
The definitions contained in Article I of the General Code apply also to this code.

Article II—Subordination

1. This Code is subordinate to the General Code and is submitted pursuant to the provisions of Section 4 of Article II of the General Code.
2. The General Code is hereby recognized as binding in this Division and all members of the industry included within this Division.
3. In the event that any provision of this Code shall be found to be inconsistent with the provisions of the General Code, the provisions of the General Code shall prevail.

Article III—Administration

1. There is hereby created a body to be known as the Executive Authority of the Cover Paper Division of the Paper Industry which shall consist of the Executive Committee and Industrial Control Committee of the Cover Paper Manufacturers Association, and of three members of the Paper Industry Authority designated by the Administrator pursuant to Section 2 of Article III of the General Code. The three members so designated shall have no vote.
2. The Executive Authority is charged generally with the Administration of this Code, and shall have such other powers and duties as are prescribed herein or in the General Code.
3. The Executive Authority shall cooperate with and assist the Paper Industry Authority in administering the General Code, and in obtaining from members within this Division such reports, statistics and other data as the Paper Industry Authority may require.
4. Subject to restrictions and safeguards similar to those provided in Article VII of the General Code, members shall furnish such additional information to the Secretary as may from time to time be required by the Executive Authority.

Article IV—Trade Customs

The Executive Authority shall formulate the recognized Trade Customs and Fair Trade Practices of this Division, any may from time to time submit any such Trade Customs of Fair Trade Practices through the Paper Industry Authority to the Administrator for approval, and the same when approved shall have the same force and effect as if incorporated in this code.

Article V—Effective Date

This code shall become effective on the second Monday after the date upon which it shall be approved by the President of the United States.

Article VI—Application

This code in all its provisions shall inure to the benefit of and be binding upon all producers of cover paper.

Article VII—Grades

This code shall cover the following grades of paper: Cover, Text, Duplex.

Swedish Pulp Cargo Arrives

[FROM OUR REGULAR CORRESPONDENT]

APPLETON, Wis., August 21, 1933.—The third Norwegian steamer to bring pulp to Green Bay, Wis., this season arrived last week. It carried 1,400 tons for the Fort Howard Paper Company and other mills in the Fox River Valley. The pulp was loaded in Sweden.

TAPPI to Visit the Fox River Valley

Kimberly-Clark Corporation

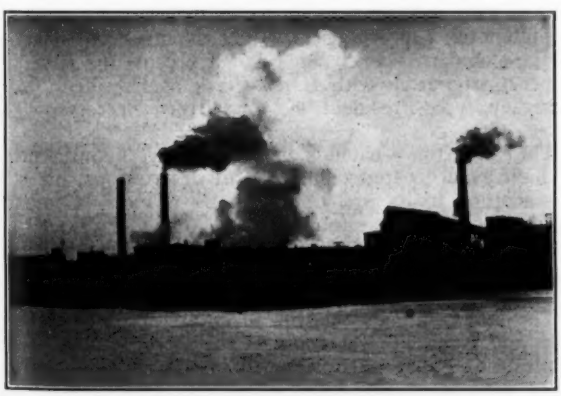
At the head of the Fox River from where that great natural reservoir, Lake Winnebago, flows continuously to Lake Michigan, we find first Neenah and Menasha. Neenah became the second paper producing community on the Fox River with the establishment of the "Old Red Mill" erected in 1865 upon a location originally occupied by a government sawmill of mission days. This mill was built by a stock company composed of Hiram and Edward Smith, Dr. N. S. Robinson, James Jameson, Moses Hooper and Nathan Cobb. Myron H. P. Hayes came from Whitewater to superintend the mill. Rags were used for the first paper stock, producing 3000 pounds of paper daily.

The first year the mill was leased to Dr. Robinson, the second year the Company operated it, the third year the Smiths took over the lease and then D. C. Van Ostrand. Under the name of Smith & Van Ostrand the mill operated until 1874 when Kimberly, Clark & Company bought it. The mill was torn down in 1884 to make room for the great Neenah mill of Kimberly, Clark & Company.

Closely associated with the pulp and paper history of the Fox River Valley are those two great pioneers J. Alfred Kimberly and Charles B. Clark. In 1872 Kimberly, Clark & Company built the Globe Mill at Neenah consisting of a 72-inch paper machine. This firm originally consisted of four members, J. Alfred Kimberly, Charles B. Clark, Frank C. Shattuck and Havilah Babcock. In 1874, as mentioned, they purchased the "Old Red Mill". Expanding rapidly with the ever-increasing demand for pulp and paper, Kimberly-Clark Corporation today has erected the Globe Mill, Neenah Paper Mill, Badger Mill, Experimental Mill and Lakeview Mill, manufacturing a diversity of papers and equipped with the most modern developments.

Neenah, Bergstrom and Gilbert Paper Companies

In 1873 A. W. Patten built the Patten Mill. In 1879



KIMBERLY-CLARK CORP., NEENAH, TODAY

Patten sold out to S. A. Cook and Frank T. Russell who operated until 1900 when they were succeeded by J. A. Kimberly, Jr. Today this is the present Neenah Paper Company.

In 1874 the Winnebago Mill was built by John R. Davis, who had as his partners John R. Ford, H. Shoemaker, C. H. Servis, C. Newman, S. M. Brown, and Mrs. E. A. Servis. George A. Whiting bought out the Shoemaker stock in 1876 and was made superintendent and secretary. The first book paper in Wisconsin was made in this mill. In 1905 the mill was sold to the Bergstrom Paper Company, which represents its present name.

The early history of pulp and paper manufacture in Menasha begins in 1882 when the Gilbert and Whiting plant was erected. The Gilbert Paper Company opened for operation in 1887 and during the same year the John Strange Paper Company developed from a pail factory. In 1888 The Menasha Paper Company began operations, this plant being operated previously by Alexander Paul,

INTERLAKE (MITSCHERLICH) DIV. OF CONSOLIDATED WATER POWER & PAPER CO., 1933

S. A. Cook, and H. H. Ballow. This mill made and still makes a strawboard. Later plants include The Island Paper Company and the Printing and Carton Division of the Marathon Paper Mills Company, The George A. Whiting Paper Company, and the Wisconsin Tissue Mills.

Passing down the formerly treacherous Fox River, through its canal equipped with twenty-six locks and twenty-six dams, we come to Appleton, the seat of the industry in the Fox River Valley. Formerly the Fox River was dotted with flour mills, due to its great potential power and close proximity to the then existing wheat fields of western Wisconsin and Iowa. Later wheat markets moved to Minneapolis mills or across Wisconsin to Milwaukee and thence by boat to Buffalo, New York. Then it was that the manufacture of pulp and paper began.

Interlake and Fox River Paper Mills

The first mill in the Valley was built in 1853 by Charles P. Richmond. This mill was owned and operated by the Richmond Brothers until 1859 when it burned down. After the fire the Richmond Brothers built a strawboard mill on the present site of the Interlake Mill. In 1891 President Grover Cleveland and a group of eastern men, including William Whitney, a member of Cleveland's Cabinet, Louis Cass Ledyard, a Wall Street capitalist, formed the Manufacturing Investment Company and sent fighting Bob Evans to supervise the construction of a Mitscherlich mill on the present site of the Interlake plant. In 1899, when the Manufacturing Investment Company went into bankruptcy, the Interlake Pulp and Paper Company, with W. A. Fannon in charge, purchased the plant. In 1916 the Consolidated Water Power and Paper Company acquired the plant and started a rebuilding campaign. Today we have the present modern Mitcherlich plant, the Interlake Divi-

sion of the Consolidated Water Power and Paper Company.

Record shows the Appleton Paper and Pulp Company as the next pulp and paper plant in Appleton, originally the Ames Pulp Company, built in 1873. The western wood pulp mills were erected about the same time by Bradner Smith & Company, Chicago. The Appleton Pulp & Paper Company was supposed to have been put in operation in 1873. John Van Nortwick was President, William Van Nortwick, Vice-President, H. J. Rogers, Secretary and Treasurer. This mill consisted of seven 550 pound beaters, one jordan, and one 68-inch Fourdrinier, 13,500 pounds news made per day. This mill later became the Telulah Paper Company with Peter R. Thom, President, W. Z. Stuart, Vice-President, J. A. Kimberly, Secretary, and F. C. Shattuck, Treasurer. This plant eventually became a division of Kimberly-Clark Corporation and then later purchased by the Fox River Paper Company in 1921.

The present Patten Paper Company has long featured in the pulp and paper history of Appleton. Originally the Valley Pulp and Paper Company organized in the spring of 1879 with A. G. Parkhurst, President, W. A. Clark, Secretary, D. M. Hyde, Treasurer. Later, Azel W. Patten moved his mill from Neenah in 1881 and formed the Patten Paper Company in Appleton, with a capacity of 10 tons of paper daily. The present Patten Paper Company, Ltd. was organized in 1882 by Azel W. Patten, Thomas Patten, his son, and John McNaughton, his son-in-law. This Company took over the assets of the former Company, known as the Patten Paper Mill. Mr. Patten was active manager until his death in 1902 and was succeeded by Mr. McNaughton until the latter's death in 1910. J. G. Rosebush is present head of the firm. The Patten Paper Mill built in connection with its paper mill a pulp mill on the property now owned by the Appleton Machine Company.

The present Atlas Mill of Kimberly-Clark Corporation is another pioneer of the industry. Established in 1879 as the Atlas Paper Company, it employed 100 men and made manila, print, poster, tobacco, express, drygoods,

PARTIAL VIEW OF APPLETON AND FOX RIVER TODAY

hardware, tea and wrapping papers with a daily output of 10-12 tons. The officers were: General Averill, President, J. A. Kimberly and H. M. Carpenter, Vice-Presidents, Colonel W. H. Stowell, Secretary-Treasurer and C. B. Clark, General Manager. The Atlas pulp mills were subsidiary to the Atlas Paper Company and were erected a short time later. The properties were later acquired by Kimberly-Clark Corporation.

The present Fox River Paper Company was originally incorporated as the Fox River Flour and Paper Company by Captain G. W. Spaulding, S. K. Wambold, J. D. Witter, J. H. Whorton, W. G. Whorton, and H. G. Freeman. In 1883 the Company started with a small unit known as the ravine mill, with a production of four tons of paper. In 1887 the second unit was erected directly south of the first plant and in 1893 the third mill. Later the Telulah Mill was purchased from the Kimberly-Clark Corporation, about 1920.

Riverside and Appleton Coated Mills

The Riverside Paper Corporation, manufacturers of sulphite bond and printing papers, is the outgrowth of the

FOX RIVER PAPER CO. AT RIGHT AND PATTEN PAPER CO., LTD. AT LEFT, TAKEN 1933.

Riverside Fiber Company, which started operations in 1893, incorporators being W. B. Murphy, Thomas Pearson, Lamar Olmstead and Henry Smith. The first plant manufactured bleached sulphite. In 1903 it was decided to build a paper mill. This plant manufactured wrapping paper almost exclusively. In 1903 the name of the firm was changed to the Riverside Fiber & Paper Company. The present mill was constructed in 1924 adjacent to the old sulphite mill. On August 1, 1929 the financial structure of the Company was changed and it became the Riverside Paper Corporation with C. B. Clark as President, E. J. Dempsey, Vice-President, E. C. Hilfert, Secretary-Treasurer.

The Appleton Coated Paper Company, manufacturers of high grade coated papers of all descriptions, owes its organization to its precursor, the Boyd Paper Company, Kaukauna, which was founded in 1906 by C. S. Boyd. The plant at Appleton was established in December, 1907. Incorporators were C. S. Boyd, Curtiss Bynum, R. E. Boyd, and John Lowe.

The latest and most novel adventure into the field of pulp and paper beyond doubt is the establishment of the Institute of Paper Chemistry. It is a graduate school organized in conjunction with Lawrence College for the training of college graduates for the field of pulp and paper and its allied industries. The progress of this institution has grown beyond the greatest expectations of its founders and the cooperation and support which it receives from the industry indicates a successful, worthwhile future. Expanding from a small beginning atop Alexander Gymnasium it now possesses two marvelous buildings, with every conceivable type of equipment and a staff thoroughly versed on the requirements of the industry.

Combined Locks and Thilmany

Our next stop down the historic Fox River brings us to the large sulphite mill and paper mill of the Kimberly-

Clark Corporation, manufacturing 175 tons sulphite pulp, 50 tons groundwood daily, besides five paper machines making 150 tons book paper daily. This mill was constructed in 1889. In 1901 the Kimberly mill was destroyed by fire and rebuilt in 1903. Since then modern improvements have converted this plant into one of the foremost pulp and paper plants in the country.

Just around the bend in the River at Combined Locks we find the sulphite pulp mill and paper mill of the Combined Locks Paper Company. The present owners are: L. L. Olsted, President, Wm. Rounds, Secretary-Treasurer. The Combined Locks Paper Company was incorporated in 1889, building at first a pulp mill and then adding a paper machine in 1890, 16 grinders, 4 digesters, 4 paper machines. This company was originally organized by Wm. M. Van Nortwick, President, John S. Van Nortwick, Treasurer.

Kaukauna represents our next stop in a review of the history of the Valley. The early history of Kaukauna revolves around the present Union Bag and Paper Company mill. In 1881 the Van Nortwicks built the Union Pulp Company Mill with 12 grinders, making 3 tons of pulp. In 1884 they took over the Eagle Paper Mill operated by H. A. Frambock, first called the Frambock Paper Company, with William Van Nortwick as President; later organized as the Kaukauna Paper Company. This mill eventually merged with the Union Pulp Mill and operated as the Western Paper Bag Company until it was taken over by the Union Bag and Paper Company.

The first paper mill in Kaukauna was the Eagle Mill, built in 1872 by Colonel H. A. Frambach. A machine was installed to grind poplar, spruce and basswood logs. This mill burned in 1881 and when rebuilt was sold to H. J. Rogers and the Van Nortwicks.

In 1885 the present Thilmany Pulp and Paper Company was established by Oscar Thilmany. This mill produced the first tissue paper in Wisconsin. The present owners are M. A. Wertheimer, President, Karl E. Stansburg, Vice-President, C. W. Stribley, Treasurer, G. J. Stansburg, Secretary.

Patten and Nicollet Mills

The Patten Paper Company, Ltd. erected the Outagamie paper mill and pulp mill in 1886, original owners being A. U. Patten, Henry Hewitt, Jr., W. P. Hewitt, and A. W. Priest.

Our next stop takes us four or five miles down the River where we find the Little Rapids Pulp Company. A groundwood mill was originally built by Lindauer and O'Connell, present owners being J. M. Shure, President, D. L. Thompson, Vice-President and Secretary, K. S. Dickenson, Treasurer.

At DePere, our next stop, we are rapidly approaching the mouth of the Fox River. Here we find the present Nicollet Paper Company, built in 1891 by H. Babcock and F. S. Shattuck and C. B. Clark, Sr. In 1899 this mill was sold to the American Writing Paper Company from whom it was acquired by its present officers.

Mills at Green Bay

We have finally reached the end of our destination—Green Bay—that thriving pulp and paper city situated on the banks of a perfect, natural harbor with direct water connection to all parts of the world. Here we find the Hoberg Paper and Fibre Company, The Northern Paper Mills, and Fort Howard Paper Company. The Hoberg Paper and Fibre Company is the outcome of the merging of two pioneer paper companies of this locality, the John Hoberg Paper Company and the Green Bay Paper and Fiber Company. The original Hoberg concern was established at Kaukauna, Wisconsin, in 1892 by John Hoberg and was a small plant. In 1895 it was removed to Green Bay by the owners, and in 1922 was consolidated with the Green Bay Paper and Fiber Company. The latter concern had been established by A. L. and Peter Rieter and was engaged in the making of wrapping paper. The Hoberg Paper and Fibre Company, which acquired both concerns, has made remarkable progress under the able guidance of J. M. Conway. The present officers are J. M. Conway, President, Thomas J. Dee, Vice-President, Frank P. Ramsey, Secretary-Treasurer, E. A. Clancy, Assistant Secretary-Treasurer and William Hoberg, Production Manager.

The Northern Paper Mills were organized in the year 1901 by the founders M. J. McCormick and N. P. Wagner. In 1916 the sulphite plant was added and in 1919 the groundwood plant. Present officers include: N. P. Wagner, President, Earle Murray, Vice-President, J. G. Rosebush, Vice-President and General Manager.

The Fort Howard Paper Company is one of the latest mills in the Fox River Valley manufacturing tissue and toweling and numerous specialties. Present officers include A. E. Cofrin, President and Treasurer, E. W. Lawton, Vice-President, C. I. Smith, Secretary.

Machine Clothing Manufacturers

A survey of the history of the pulp and paper industry in the Fox River Valley would not be complete without mention of the great number of allied industries. At Appleton we find the Appleton Wire Works, founded in 1896 by G. F. Buchanan and J. R. Buchanan. Starting from a small shop with four or five looms, it has developed today into one of the country's greatest wire manufacturing plants. Other wire manufacturing plants include the Wisconsin Wire Works and the Green Bay Wire Works.

We also find in Appleton that unique craft, the manufacture of "dandy rolls". J. J. Plank started his training for his work in the dandy roll department of the old Appleton Screen Plate Company, now out of existence, in which he started work thirty years ago. In 1908 he rented two rooms in the former Appleton Paper Box Factory. Two persons were employed, a girl to fabricate the tiny copper wire letters and a man to make the wire trusses. Mr. Plank did the designing. Expanding trade eventually compelled Mr. Plank to build a larger plant, which now stands on North Clark Street.

The Appleton Woolen Mills started in 1861 by G. U. Spaulding and J. W. Hutchinson. This organization lived through fires and several financial panics and was the first building in the country to operate with an individual electric light plant.

Machine Shops

Appleton and the Fox River Valley can boast of numerous modern machine shops. The Valley Iron Works started in a small machine and blacksmith shop in 1883 by Messrs. Proctor, Clark, Byrnes and Rogers, on the present site. In 1898 Mr. E. A. Peterson took over the plant. W. H. Burns joined the plant in 1902 and three years later became secretary. Today Valley Iron Works boasts an extensive plant manufacturing a diversity of pulp and paper machinery.

The Appleton Machine Company had its beginning as a humble blacksmith shop operated by Crosby Ketchum in 1857. The Appleton Machine Company was organized in 1883 by Gotfried Saecker and three sons, F. E., H. G., and W. F. Today one will find products of the Appleton Machine Company in most plants throughout the country.

Truly a history of the Fox River Valley is a history of the pulp and paper industry. Situated here in a small area one will find the manufacture of pulp and paper in all its ramifications. Is it not more than a coincidence that the

first plant built, and the plant undergoing the most modern and latest improvements, should be situated on the same site? Richmond built his first mill on the present Interlake site. Consolidated Power and Paper Company just recently rebuilt their entire pulping plant with the erection of nine modern digesters for the manufacture of Mitscherlich pulp. The guidance of the policy of the early settlers was under the direction of Amos Lawrence, the founder of Lawrence Institute, around which the community was built. Should it not be perfectly fitting that the guidance of the younger generation entering the pulp and paper industry should eminate from the same source? Such is indeed the case with the founding of the Institute of Paper Chemistry, whose policy is directed by the present head of Lawrence College, Dr. H. M. Wriston.

Every member of TAPPI should strive to attend the fall meeting September 26-28, 1933. 1933 represents the Diamond Jubilee of the pulp and paper industry in Wisconsin, it being seventy-five years since Ludington and Garland built the first mill in Milwaukee in 1848 at a cost of $10,000, employing ten hands, with a payroll of $40 a week, producing 110 reams of paper which was then more than sufficient to supply the press of the state.

1933 also represents the 18th anniversary of TAPPI. Enthusiasm is running high in the Fox River Valley in anticipation of the fall meeting. Committee meetings have precedence over all other engagements. Program, mill visits, entertainment, and other details have been practically completed. Every effort is being made to insure a complete, worthwhile program for each individual attending. Mrs. LeRoux and members of her committee have prepared a complete program for the ladies. There is no doubt but that they will be happily engaged every minute of their visit.

Remember, then, the "Diamond Jubilee" of the pulp and paper industry of Wisconsin and the 18th anniversary of TAPPI at Appleton, Wisconsin, September 26-28, 1933.

Textbook Sales Holding Up

Sales of the Textbooks upon Pulp & Paper Manufacture held up remarkably well during the depression, according to a report by the McGraw-Hill Book Company to the Textbook Committee.

For the six months ending December 31 last, a total of 147 copies of the five volumes were sold, while for the six months ending June 30, 1933, sales totaled 168 copies. It is particularly encouraging to note that during the recent six months period 61 copies of Volume IV were purchased by students of the industry and that another printing of it will be required in the near future. This is the volume which deals in detail with the preparation of rag and other fibers, treatment of waste papers, beating, refining, loading, sizing, coloring, etc., in addition to general mill equipment.

The first book of the series was published in February, 1921, and total sales to date have amounted to 23,741 copies distributed as follows:

Vol. I	4,123
Vol. II	3,377
Vol. III	6,494
Vol. IV	5,383
Vol. V	4,364

The Textbook Committee receives standard royalties from the publishers on all sales, which constitute a permanent and adequate fund with which to finance the necessary revisions from time to time in order to keep the Textbooks abreast of a constantly developing industry.—R.S.K.

Boston Paper Trade Happenings

[FROM OUR REGULAR CORRESPONDENT]

BOSTON, Mass., August 21, 1933—It is understood that the directors of the George W. Wheelwright Paper Company, are to propose to make a 20 per cent dividend on the preferred accounts to creditors. All persons interested have received a notice to appear in the Suffolk Superior Court today in connection with the allowance of the report of Receivers George W. Wheelwright, Carl F. Woods and George Alpert.

Arthur M. Burr has returned from his trip to the Badger Paper Mills, Peshtigo, Wis., of which he is representative. He says that the company has more business than it can take care of comfortably, but an enlargement it hoped for before long.

Nathan S. Clark, president of Knight, Allen & Clark, Inc., left Saturday for a two weeks' vacation at his summer residence, at Gilmanton, on Crystal Lake, New Hampshire.

Charles W. Fields, vice-president of the Baird & Bartlett Company, left Saturday for a two weeks' vacation at Newfound Lakes, and Bath, N. H., accompained by Mrs. Fields.

H. H. Rutter, treasurer of Rutter & McNaught, Inc., has gone to Madawaska, Me., for a ten days' vacation.

Edwin D. Reynolds, of the sales staff of the Poinier-Carmer Company, has gone on a two weeks' vacation touring in his automobile, including Gettysburg, accompanied by Mrs. Reynolds.

Robert C. Kennedy, son of W. M. Kennedy, of the sales staff of Knight, Allen & Clark, Inc., has taken a position as assistant chemical engineer at the Mathieson Alkali Works, Saltville, Va. Mr. Kennedy received his degree of B. S. form the University of Florida and that of S. M. from the Massachusetts Institute of Technology in 1932.

The Tileston & Hollingsworth Company has a display in a window of the South Station, showing work done by New England printers on paper manufactured in Boston by the company, "Paper makers for more than 130 years." Book covers, magazine covers and several books are shown with the announcement: " 'Four of the Fifty Best Books of the Year' as chosen by the American Institute of Graphic Arts were printed on papers manufactured by Tileston & Hollingsworth Co."

The Boston and Maine Railroad has asked permission of the Interstate Commerce Commission to withdraw its proposed increased storage rates on wood pulp at Boston when the pulp is removed from storage by truck, offering to increase the wharfage charges from 50 cents per ton to $1 per ton on pulp which is to be removed by truck.

The New England Freight Association is to cut the rate on wood pulp from Basin Mills to Cumberland Mills, Me., from 15.50 cents to 13 cents per 100 pounds.

Modified Box Agreement

WASHINGTON, D. C., August 24, 1933—General Hugh S. Johnson has authorized the paper box industry to sign a modified Presidential reemployment agreement pending public hearings on and approval of their proposed code for fair competition.

This agreement establishes a maximum work week of 40 hours with an exception for peak periods when the maximum may be increased to 48 hours per week. In the agreement the minimum wages are fixed at "not less than 40 cents per hour, unless the hourly rate for the same class of work on July 15, 1929, was less than 40 cents an hour." In the latter case, it is agreed not to pay less than the hourly rate on July 15, 1929, with additional provision that "the minimum rate of pay for the least skilled worker in this industry shall be 32½ cents per hour, except that in the Southern division it shall be 30 cents per hour."

CONSTRUCTION NEWS

A Summary of Vital Facts Regarding Construction, Finances and Operation of Paper Mills

Construction News

Carthage, Ind.—The Container Corporation of America, 111 West Washington street, Chicago, Ill., manufacturer of paper and paperboard boxes and containers, has approved plans for new two-story addition to branch plant at Carthage, 58 x 135 feet, estimated to cost over $35,000, with equipment. General contract has been let to the Insley Manufacturing Company, 801 Olney street, Indianapolis, Ind., structural steel, etc., and for masonry, to J. W. Mueller, 42 South Ninth street, Richmond, Ind.

Middletown, Conn.—The W. S. Miller Box Company, Washington street, manufacturer of paper boxes, cartons, etc., has awarded general contract to C. O. Stone & Son, Inc., Fairview street, Portland, Conn., for a new one-story addition to plant, about 60 x 60 feet.

Old Hickory, Tenn.—The duPont Rayon Company, 350 Fifth avenue, New York, N. Y., has authorized an expansion and improvement program at cellulose rayon mills at Old Hickory, to be carried out over a period of months. New mill units are proposed, with installation of additional equipment for large increase in present output. Entire project is reported to cost over $2,500,000, including equipment. Immediate work will comprise enlargement of power plant and installation of new machinery.

Los Angeles, Cal.—The Los Angeles Paper Manufacturing Company, 1630 San Pablo street, has filed plans for new one-story addition, 40 x 40 feet, and will proceed with superstructure at once. Blaine Noice, 5436 Carlton Way, Los Angeles, is engineer.

St. Louis, Mo.—The Cupples-Hesse Envelope and Lithographing Company has been organized to take over and consolidate the Samuel Cupples Envelope Company, 628 South Sixth street, and the Hesse Envelope and Lithographing Company, 4173 North Kingshighway, manufacturers of envelopes and other commercial paper products. Consolidated company will carry out a general expansion program. The Hesse company, as recently noted in these columns, has plans for the construction of a new addition to paper converting plant, reported to cost about $40,000, and it is understood that this work will be carried out at early date.

Hartford City, Ind.—The Hartford City Paper Company is adding to its working force, giving employment to about 50 additional operatives on a recently adopted 44-hour weekly schedule.

Kimberly, Wis.—The Kimberly-Clark Corporation has approved plans for alterations and improvements in the machine department at local mill, and will begin work at early date. No estimate of cost has been announced.

Chicago, Ill.—The Northwest Paper Company, Cloquet, Minn., has leased space in the building at 111 North Canal street, Chicago, totaling about 12,000 square feet of floor space, and will occupy for a new factory branch, storage and distributing plant.

Montreal, Que.—The Brockway Tissue Mills, Ltd., Montreal, is planning early construction of a new one-story mill, estimated to cost close to $50,000, with equipment. F. G. Bush is general manager.

New Companies

Utica, N. Y.—The Stone Paper Company, Inc., has been chartered with capital of $25,000, to manufacture and deal in paper products of various kinds. Company is headed by Saul Stone, 1610 Oneida street, and Arthur Stone, 2311 Genesee street, both Utica.

Chicago, Ill.—The Paper Mills Company, 223 West Monroe street, has been organized with capital of 250 shares of stock, no par value, to manufacture and deal in paper goods. The incorporators are G. C. Cobean, H. W. Reiher and L. H. Lake.

Montclair, N. J.—Cardinell Corporation has been organized with capital of 1000 shares of stock, no par value, to deal in paper products of various kinds. The incorporators are John D. Cardinell, 15 Label street, Montclair, and E. P. Cardinell.

New York, N. Y.—The Packard Paper and Twine Company, Inc., has been incorporated with a capital of 100 shares of stock, no par value, to deal in paper goods of different kinds, and kindred products. William N. Cleverley, 279 Henry street, Brooklyn, is one of the principal incorporators.

New York, N. Y.—The Ehrnholm Paper Company, Inc., has been incorporated with a capital of $5,000, to deal in carbon papers and kindred processed paper stocks. The incorporators are James R. Battelle, 33-24 150th street, Flushing, L. I., and Walter F. Ehrnholm, 269 Clay avenue East, Roselle Park, N. J.

Los Angeles, Cal.—The Chicago Parchment Shade Manufacturing Company has been organized with capital of 100 shares of stock, no par value, to manufacture parchment paper specialties. The incorporators are Benjamin and Morris Beard, both of Los Angeles.

Fort Orange 75 Years Old

The PAPER TRADE JOURNAL congratulates the Fort Orange Paper Company on the seventy-fifth anniversary of its organization. In celebrating the event, the company has just issued a handsomely engraved announcement with the following text:

"The officers, directors and staff of the Fort Orange Paper Company, Castleton-on-Hudson, N. Y., send greetings and best wishes on this, their seventy-fifth anniversary together with grateful appreciation of the loyalty of friends and patrons which has for so many years given their products a position of leadership in the industry."

Obituary

Edwin G. Bobb

ALTOONA, Pa., August 21, 1933—Edwin W. Bobb, prominent resident of Roaring Spring and well known throughout the country and practically all his life interested in the manufacture of paper and blank books, as well as in banking and civic affairs, died July 26 at his Spang street home in Roaring Spring.

Mr. Bobb's health had been impaired for some time. Last winter, in company with his wife, he motored to St. Petersburg, Fla., where his illness took a serious turn and in February he returned to his home in Roaring Spring, where he had been confined since.

Mr. Bobb was the son of Major Alexander and Matilda (Mattern) Bobb, and was born at Martinsburg on June 21, 1855, where he attended school and later completed his education at Washington college, Cannonsburg, Pa., and upon his return he was engaged in the foundry business in Roaring Spring where he continued for several years and then accepted a position with the D. M. Bare Paper Company, with which business he had been associated ever since.

Edwin G. Bobb was united in marriage with Clara Susan Bare, the first child of the family of Daniel M. and Sarah Eby Bare, and for the past three score years was a resident of Roaring Spring.

Mr. Bobb continued his activities and interests in the industrial plants about the community and following the death of his father-in-law, Daniel M. Bare, assumed almost complete responsibility of interests in the borough.

Following the acceptance of the position with the D. M. Bare Paper Company at Roaring Spring, by Mr. Bobb, he was given the managership of the paper plant and at the incorporation of the paper company in the year 1907, continued as general manager for a number of years, as well as president of the company, and a member of the board of directors, which posts he held at death.

Mr. Bobb was a member of the small company which in 1886 began the erection of a blank book factory in Roaring Spring, and later assumed the post of president of the Roaring Spring Blank Book Company, which he held for many years. Later this post was transferred to Dr. A. L. Garver, now deceased, and thence to a son, Ivan E. Garver, who at his retirement from this work a number of years ago handed the presidency of the plant to his brother, Russel B. Garver, who continues in this capacity today.

In the year 1902, E. G. Bobb, with a number of other interested persons of the community met in the office of D. M. Bare for the purpose of organizing the Roaring Spring bank, and following the erection of the bank building at the site on Main Street where it stands today, Mr. Bobb became a member of the board of directors and on January 12, 1916, when D. M. Bare, who had served as president of the financial institution since its organization declined a reelection, Mr. Bobb was elected president and continued in that capacity to the present time.

In addition to his management and supervision of many plants in the borough, and his charitable work throughout the county, one of the greatest accomplishments during his entire life was, without a doubt, the making possible of the Nason Hospital's continuous operation. Mr. Bobb, with his wife, in past years have endowed the Nason Hospital with gifts which made it possible for the institution to continue operation, and for the past years Mr. Bobb served as president of the organization and for many years had been a member of the board of directors.

At the time of remodeling the institution and converting the W. A. Nason residence near the hospital into a home for student nurses and members of the staff, Mr. and Mrs. Bobb purchased the property and saw to it that every possible convenience was installed for the comfort of the nurses and later remodeled the home and erected a large addition to the building for gym purposes, at the same time making it possible for the remodeling of the entire hospital building.

John Dailey

[FROM OUR REGULAR CORRESPONDENT]

BOSTON, Mass., August 21, 1933.—John Dailey, 78 years of age, formerly superintendent of the Union Bag and Paper Company, of Watertown, Mass., died suddenly Tuesday at Hampton Beach, N. H., while visiting friends. Mr. Dailey, who lived at 21 Walnut street, Watertown, retired from active work twelve years ago.

He was a member of Pequossette and Victory Lodges of Masons in Watertown. Two sons, John and Henry E. Dailey; and three daughters, Mrs. Anne E. Hodgdon, Mrs. Evelyn Lane and Mrs. Mildred Moore, all of Watertown, are living.

Walter B. Brockway

PORTLAND, Me., August 21, 1933.—Walter B. Brockway, aged 63, comptroller for the Brown Company, died August 11 at a local hospital, where he underwent an operation on August 6. He had been comptroller of the Brown Company and the Brown Corporation of Canada since 1914, reorganizing the costs and accounting systems of the two companies, and in 1926 was called on to analyze the Maine financial system. He was a member of various civic organizations, a trustee of Westbrook Junior College and an incorporator of the Maine General Hospital. A wife, two sons and a daughter are living.

Albert Edwin Lyons

WORCESTER, Mass., August 21, 1933.—Albert Edwin Lyons, aged 67, retired former president of the Higgins Wall Paper Company of Worcester, died August 14 at the Memorial Hospital here. His residence was at 46 Dover street. He retired from business ten years ago.

Mr. Lyons was a member of the Masons and the Odd Fellows, the Worcester Country Club and the Worcester Council of Commercial Travelers.

Besides his wife, Mrs. Blanche Brainard Lyons, he leaves a nephew, William F. Gilbert; a niece, Helen S. Gilbert, and two cousins, Fred Lyons and Mrs. Edmund Belcher.

German Paper Men Visit Mills

HOLYOKE, Mass., August 21, 1933.—Johannes Wiede, his son, J. Anton Wiede, and Director F. Kropf, of the Papierfabrik Wiede & Sohne, of Trebsen near Leipzig, Germany, are on a tour of the States and Canada, visiting various paper mills en route, terminating in the Century of Progress Exposition, and visiting mills in Ohio and Erie on their return.

While in Holyoke, they visited the mills and laboratory of the American Writing Paper Company, Inc., mills of the Chemical Paper Manufacturing Company and Crocker-McElwain Company, and also while in the vicinity, went through the Strathmore Paper Company's mills at Mittineague and Woronoco. When they left Holyoke, they intended to spend some little time visiting mills in Canada in the vicinity of Montreal and Quebec.

Paper Mills May Sign NRA Code

Charles W. Boyce, executive secretary of the American Paper and Pulp Association, has sent the following announcement to paper and pulp mills:

"Enclosed is a statement announcing that the Administrator has approved the substitution of the wage and hour provisions of the General Code of Fair Competition for the Paper and Pulp Industry with some modifications for corresponding sections in the President's Reemployment Agreement. At the end of the announcement is a paragraph that should be typed on or attached to the Agreement when signed.

"In the hours-of-work clause, the Administrator restated the definition of the groups covered to conform with the wording of the Reemployment Agreement. Woods' workers are exempt for the time being pending the approval of the Lumber Code, when some arrangement will be necessary to cover workers in pulpwood operations.

"The Reemployment Agreement is designed for individual use. It is not intended for group action; there is no machinery as yet by which groups may take action except through the submission of a code. Individuals may, pending the approval of a code, join in the National Recovery Administration movement by signing the Reemployment Agreement. In so far as labor conditions are concerned the substituted sections permit doing so without setting up conditions of hours or wages that will be out of harmony with our Code.

"Reemployment Agreement provides in Section 14, that adjustments can be made subsequently, if the signing creates "great and unavoidable hardships," by taking prescribed steps through a representative trade body. Instances of such conditions should be reported promptly to your divisional association.

"The decision to sign the Agreement rests entirely with the individual company. To date such action has not been made mandatory. It is, however, a step in cooperation with the national movement to rehabilitate industry and strengthen business and the President has urged every employer to cooperate with him to this end."

The statement referred to in Mr. Boyce's letter was printed last week in the PAPER TRADE JOURNAL. The announcement which Mr. Boyce states should be attached to the President's Agreement when signed is as follows:

"To the extent of N. R. A., consent as announced, we have complied with the President's Agreement by complying with the substituted provisions of the Code submitted for the Paper and Pulp Industry."

New Jersey Chapter Formed

NEWARK, N. J., August 21, 1933—At a largely attended meeting, 57 prominent dealers, graders, and packers from various New Jersey cities being present, held at the Robert Treat Hotel, Newark, N. J., last night, the New Jersey Chapter of the Eastern Association of Dealers in Paper and Woolen Mills' Supplies was formed, and the following officers were elected: William P. Kelly, of Kelly & Co., Inc., Newark, N. J., president; Louis E. Meluso, of A. Meluso & Sons, Inc., Jersey City, N. J., vice president; Anthony F. Carlo, of John H. Carlo & Sons, Inc., Newark, N. J., treasurer and William Yeskel, of the Textile Bag and Waste Company, Newark, N. J., secretary.

The meeting was called to order with William P. Kelly, of Kelly & Co., Inc., acting as temporary chairman. Following the election of officers, extended discussion of various suggested trade practices to govern trading in the industry under the Code of Fair Competition was engaged in, and continued until past midnight.

Mr. Kelly in accepting the presidency of the New Jersey Chapter stated that the formation of the Eastern Association was a step in the right direction and that the forming of local chapters was something that those engaged in the industry had looked forward to for many years.

Continuing, Mr. Kelly said—"What we need is leadership. A leadership that will be decidedly different from what we have had in the past. That leadership rests at the helm of our parent organization—the Eastern Association. The qualities of such a leader are manifold. He must not only be aggressive but progressive as well. He must be a hard and willing worker, a fighter and one who is human. I am happy and proud to say that we have with us tonight a man who possesses all these qualities. He needs no introduction to you." At this point Mr. Kelly called upon Charles J. Browne, managing director, Eastern Association of Dealers in Paper and Woolen Mills' Supplies, who was the principal speaker of the evening.

Following Mr. Browne's address, brief addresses were made by Louis E. Meluso, Anthony F. Carlo, William Yeskel, and others. Forty-six applications were received for membership in the New Jersey Chapter.

Temporary offices of the New Jersey Chapter will be maintained at Robert Treat Hotel.

Philadelphia Bag Division Formed

In the early part of July, the Wrapping Paper Division of the Philadelphia Paper Trade Association appointed a Bag Committee composed of Frank T. Hufnal, chairman, Huff Paper Company; Charles Mather, Mather Paper Company; N. D. Isen, Enterprise Paper Company, and Benjamin Kessler, B. Kessler Paper Company.

The first duty of the committee was to call together the seventy odd jobbers in the Philadelphia district in order to co-operate with the provisions of the National Recovery Act. The first meeting was held July 11 in the offices of the D. L. Ward Paper Company. The Bag Division affiliated with the Paper Trade Association was organized, and so far has accomplished its purpose for the stabilization of prices among the retail trade and co-ordination of effort in working out the different phases of the Code.

At the dinner and meeting held Tuesday evening, July 18, at the Broadwood Hotel, the association unanimously agreed to accept the recommendations of the National Paper Trade Association in the matter of the Code. The organization of the work was considerably assisted by the efforts of George Ward, of the D. L. Ward Paper Company, Philadelphia. The chairman, Mr. Hufnal, is very grateful for the co-operative spirit evidenced by the committee and all those who "put their shoulders to the wheel" to forward the success of the work.

Eaton-Dikeman Enlarge Plant

The Eaton-Dikeman Company, operators of the Holly Glen Paper Mills at Mt. Holly Springs, Pa., according to a press dispatch have started building operations that will double the present capacity of their plant.

The company, which specializes in manufacturing filtering paper, reopened the Holly plant in April. Their plant at Lee, Mass., had been destroyed by fire and all their manufacturing activities are now centered at Mount Holly Springs.

According to Superintendent E. W. Dowd, the company's business is excellent and the force here is being increased more rapidly than at first expected.

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STATUS OF THE CODES

Numerous requests coming to the office of the PAPER TRADE JOURNAL evidence some impatience at the slowness with which the various paper codes are being filed. This slowness, however, is more apparent than real. This is an important job and there are no precedents to guide those who are doing the work. Under all the circumstances, therefore, we are confident that the work is being done just as expeditiously as possible.

It should be remembered that the general paper code has in effect been written three times. First there was the preliminary draft which was published to stimulate discussion and to lay the ground work for the original code which was filed during the last days of July. This was superseded by a modified code filed August 15 at the suggestion of the N. R. A. Administration to eliminate controversial factors with a view of making the code effective at the earliest possible moment. The code in its present form is in general more concisely written than was the original. It differs also in several important respects from the first code, the most noteworthy difference being that the clause limiting the installation of new machinery is entirely eliminated. The revised code is printed elsewhere in this issue as are a number of subordinate codes, and it is believed that it will be possible to print all of the remaining codes very shortly now.

So that the many persons in the paper industry who are carefully following the building of the codes, as evidenced by the numerous communications reaching the office of the PAPER TRADE JOURNAL, may understand the work entailed, the following official outline of the organization and procedure of the National Recovery Administration is presented herewith:

"General Hugh S. Johnson, as Administrator, heads the organization of the National Recovery Administration. Under the terms of the National Industrial Recovery Act, a procedure has been established to guide the development of codes of fair competition by industry and labor. In order to make this provision effective, three Advisory Boards have been established, namely, the Industrial Advisory Board, the Labor Advisory Board, and the Consumers Advisory Board. The form and content of any code must in the first instance be developed by negotiations and conferences within an industry. In order to safeguard the interests of all involved, however, these negotiations are supervised in their final stages by the three Advisory groups—Labor Advisory and Industrial Advisory Boards appointees being available to consult with the respective industries, while Advisors of the Consumers Advisory Board safeguard the interests of the public.

"In order to explain the National Recovery Administration, one might compare it to a three cornered game, in which labor, industry, and the consumer are players. The National Recovery Administration is not involved in any attempt to direct any player. Rather, it occupies the position of a referee, insuring the establishment of proper rules of play, and seeing that no one player achieves an unfair advantage. The organization of the National Recovery Administration includes a number of Deputies, a number of Divisions which work on separate problems in order to advise with the Deputies, and the Labor, Industrial and Consumers Advisory Boards. At the present time there are thirteen Deputy Administrators, each with one or more assistants. The tremendous volume of work, and the immediate need for action require that this number be expanded considerably.

"Besides the Deputies, there are Divisions which specialize in legal problems, in code problems, in research and planning, and in maintaining contact with the public. The Legal Division checks all documents before they reach their final form to insure the legality of any agreements made by industry and labor under the guidance of the National Recovery Administration. All codes are examined in the Code Division, where a group of specialists analyzes each provision in order to determine as far as possible, whether on broad lines and principles, it insures fairness to all parties involved.

"The Research and Planning Division has really two functions; first to provide Deputy Administrators with authoritative and impartial information and statistics which will aid them in determining whether any particular provisions are fair or not; and second, to maintain a group of expert economists who are relating the codes of various industries to one another with the object of foreseeing as far as possible, the effect of each code on the industry itself, and insuring the proper relationship, and balance between various industries. In order to outline the procedure of having a code approved by the President of the United States, let us start with the requirements of the law. In the first place, application for a code of fair competition must be made by a trade or industrial association

or group—not by an individual. Such an association or group must be open to all members of a given industry. In order to make such an application, a group or association must be truly representative of the trade or industry involved. Accordingly, the first step in having a code of fair competition approved by the President, must be the organization of a trade association or trade group. What is more, such a trade association or group must be representative of an industry or subdivision of an industry. If a trade group or association has been formed, or is in existence, that association or group may file with the National Recovery Administration a code of fair competition.

"In order to speed up the operation of the National Recovery Administration, a regular procedure has now been adopted, a procedure which has been evolved as a result of the intensive experience of the National Recovery Administration over the past six weeks. In order to start filing a code, a letter or personal inquiry should be addressed to the Control Division of the National Recovery Administration. There any applicant, association, or group will be supplied with proper forms which will supply to the National Recovery Administration certain information required in determining whether a code to be filed by that group can properly be considered. After the application form has been filled out and returned to the Control Division, the association or group can submit a tentative draft code to the Control Division of the National Recovery Administration. From the standpoint of the internal workings of the National Recovery Administration, the Control Division is a clearing house through which all contacts between any trade or industrial group or association may be made with the National Recovery Administration. All inquiries and correspondence should be directed to the Control Division up to the time that the Control Division has assigned the industry to a Deputy Administrator who will carry on further negotiations.

"Once a tentative draft code has been submitted to the Control Division, it is passed to the Code Division—known internally as the Code Analysis Division. There, a group of experts examine each provision of the code, and where that group can make helpful suggestions to the trade association, a memorandum is prepared, the contents of which are communicated to the trade association by the Deputy Administrator. If any necessary clauses or provisions are omitted from a tentative draft code, the Code Division will point out such omissions. After a code has passed through the Code Division and has either been approved by that Division as being in proper form for further steps or has been revised so that it is in proper form for further procedure, the Control Division will place the trade association or group into contact with the Deputy Administrator who will handle the code and under ordinary conditions will be expected to preside at the public hearing. In filing a tentative draft code, eight copies should be filed. One of these copies is held in the Control Division in a master file; one copy goes to the Code Division; three copies go, one to each one of the Advisory Boards—Labor, Industrial, and Consumers. A copy is sent to the Deputy Administrator, and a copy is delivered to the Research and Planning Division.

"When a code is in form for a conference, it is generally advisable for a group or an association to select a small number of men, preferably less than four, to meet with representatives of the National Recovery Administration in Washington, in order to discuss the code. At this conference, the representatives of the industry will meet not only the Deputy Administrator, but also Advisors appointed by the three Advisory Boards, and possibly such other experts as may be required in the conference—for example, members of the Legal Division or of the Research and Planning Division or of the Code Division. As a result of this conference, a full understanding can be had by the committee representing an industry or trade of the objectives to be accomplished by the code. Perhaps some further revisions may seem desirable at this point. When finally a code has been whipped into shape for the public hearing, the association or trade group makes a written request for a public hearing on the suggested code. The National Recovery Administration sets a hearing date in Washington, giving notice to all members of the industry through complete publicity in every important trade publication and newspaper.

"Finally the hearing date arrives. All the provisions of the suggested code have been published. Any person, whether having a labor, industrial, or consumer interest with regard to the code in question, may be heard. The only requirement is that persons who wish to be heard, notify the Deputy Administrator in charge prior to the hearing. On the date of the hearing, representatives of both employers and employees in the industry meet in Washington. The Deputy Administrator is Chairman. He will probably have with him members of the Labor, Industrial, and Consumers Advisory Boards, as well as members of other divisions of the National Recovery Administration, such as the Research and Planning Division, and the Legal Division.

"These hearing are not debates or trials. No argument is permitted. They are merely convenient means of determining the facts in any industry so that the Deputy Administrator may report to the President with recommendations on the code suggested by any given trade or industry group. It is important to realize that the public hearing is merely a fact-finding device—not a device in which oratory or persuasion can win advantage. After the Deputy has obtained a complete knowledge of all the facts in the case, he prepares his report on the code. Before preparing this report he receives reports from the Legal Division and from the Research and Planning Division. The Deputy Administrator's report is reviewed by General Hugh Johnson, and is finally passed to the President of the United States, who by his signature establishes the code provisions as the effective rules of the game in the particular industry."

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Technical Association of the Pulp and Paper Industry
Edited by Ronald G. Macdonald, Secretary

An Alkaline Process for Obtaining High Yields of Pulp from Aspen Wood*

By Roy L. Davis [1]

Abstract

A process of soda cooking, consisting of an alkaline digestion with a low percentage and concentration of alkali followed by a first stage chlorination, an alkaline wash, and a final hypochlorite bleach, has been studied and has been found to give favorable results.

Yields of around 56 per cent of bleached pulp based on the wood may be obtained where a rod mill is available for intermediate refining, or of 53 to 54 per cent where a rod mill is not available. The bleach consumed by these two types of cooks is 30 and 20 per cent, respectively. This may be compared with a yield of 42 to 45 per cent of bleached pulp and a bleachability of 8 to 10 per cent by the commercial soda process. Black liquor may be used to make up the cooking liquor volume without any appreciable ill effect upon the pulp. The softened chips can be blown from a semi-commercial digester with a two-inch blow line, the stock being disintegrated to pulp form. Further reduction of screenings to pulp is easily accomplished by the use of a rod mill.

The results obtained by the use of a typical dilute kraft liquor, consisting of two parts of caustic soda to one part of sodium sulphide, were no better than those obtained by the use of a dilute soda liquor.

Two-stage bleaching, using chlorine in the first stage followed by an alkaline wash and completion of bleaching with hypochlorite, is beneficial mainly in the amount of chlorine used. About 33 per cent of the total chlorine can be saved by this process.

It is not possible to obtain yields as high as the above by the use of concentrated cooking liquors and a shorter cooking period.

The chemical tests on the pulps obtained by the use of dilute liquors followed by first stage chlorination bleaching are equally as good as those obtained on commercial pulps.

The bursting strength of the pulps produced by cooking with dilute alkaline liquors is from 50 to 100 per cent higher than that of commercial pulps. The tearing strength of the pulps is also higher than that of normal soda pulps.

A chemical balance showed that the method of cooking with dilute liquors followed by chlorination bleaching, an alkaline wash, and a hypochlorite bleach, was much more efficient in preserving the cellulosic portion of the pulp.

The opacity of the pulps in the unbeaten state was about the same as the opacity of the commercial pulps. When beaten, the commercial pulps, which do not hydrate readily, had a greater tendency to retain their unbeaten opacity.

A beater run on a mixture of 50 per cent sulphite and 50 per cent soda pulp showed that the mixture containing the pulp prepared in the Institute laboratory was higher in bursting and tearing strength than the mixture containing the commercial pulps. Ash contents and opacities were higher on the mixture of commercial pulps. This, however, could be offset by increasing the percentage of filler used, since the strength of the finished sheet would still be at least the equivalent of that obtained with commercial soda pulp.

The chief paper making material during the last fifty years has been wood. While the paper making properties of thousands of cellulose yielding plants have been studied during this period and it has been found that paper can be produced from all these plants, difficulties in separating a uniform quality of fiber and establishing a large enough source of supply, losses in storage, and many other drawbacks have prevented these materials from becoming of any great practical use in this country. Wood gives the highest yields of cellulose of any plant material; moreover, the sources of supply will be sufficient for many years to come, and the material is easy and compact to transport and handle. It is doubtful, therefore, whether wood will ever be replaced by any other material.

The fact that wood has so many advantages as a source of paper making cellulose has made it the object of many investigations, all of which have aimed at an improvement in quality or yield of paper making cellulose. As a result, many new processes have been developed for bringing about these improvements.

Although the supply of wood is still very large, it is

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limited in the vicinity of many mills and the cost is thereby considerably increased. This makes the wood by far the most expensive part of the paper making process. By analysis, aspen wood contains 64 per cent of Cross and Bevan cellulose, of which about 42 per cent remains after the wood has been subjected to the commercial cooking and bleaching processes. In other words, only two-thirds of this expensive raw material have been recovered for paper making. The use of such drastic cooking methods has hitherto been necessary to obtain a pulp which would bleach easily. It has long been known that gaseous chlorine is a good delignifying agent, and now, as a result of the low cost and easy availability of liquid chlorine as well as the development of methods and equipment for the application of gaseous chlorine to pulp, the importance of the low bleachability of the pulp has been considerably lessened.

The object of this investigation has been to study the variables involved in a combined soda-cooking, chlorine-bleaching process, in the hope of developing a process which would permit the recovery of a higher fraction of the desirable paper making constituents of the wood than is ordinarily accomplished by the present commercial cooking methods.

Since the use of high concentrations and amounts of alkali are known to result in a low yield of fiber, this study has been limited to the determination of the optimum conditions under which low concentrations and amounts of alkali would function. The time, pressure, and amount of alkali were varied within the range which would give a maximum yield of pulp with a minimum bleachability. The physical and chemical properties were analyzed and compared with commercial pulps. Finally, a study was made of the paper making properties of the pulps themselves and the possible difficulties to be encountered in the commercial application of the process.

Historical Discussion

I. The Soda Process.

The first use of alkaline liquors for separating cellulose from lignin in the wood was made by Koop *(1)*, who treated with soda liquor in open containers and later subjected the material to bacteriological decomposition to complete the delignification.

The patents of Watt and Burgess *(2)* form the basis of our present day soda cooking operation. The first commercial installation of the process in this country was made in the early sixties. The operation of the method was as follows: Wood was cooked with a solution of caustic soda, the strength depending upon the nature of the wood; for example, a solution of 55 grams per liter was recommended for soft woods. The length of the process also depended upon the type of wood used. The discoverers considered the use of pressure necessary, but did not make it a specification of the patent. The liquor was evaporated and burned for the regeneration of the soda. The hot wood chips were bleached with chlorine gas or chloric acid compounds. The American patent was very much like the English, the main difference being in the handling of the chlorine gas.

Houghton *(3)*, realizing that the pressures and temperatures used in the above process were too low, took out a patent on cooking at higher pressures. The following specifications were given as a desirable range for the process: a caustic liquor of 45 to 59 grams per liter and a temperature of 180 to 187 deg. C., corresponding to a gauge pressure of 130 to 155 pounds per square inch. The amount of chemical and time were not specified.

The cooking process used in the first American plant at Manayunk, Pennsylvania, treated wood chips with an 88 gram per liter caustic soda liquor for six hours at a temperature of 160 to 172 deg. C. The details of the process were much more like the Houghton process than like the Watt and Burgess process. It can be said, therefore, that Houghton's method was basic for the commercial development of the soda process.

From this point, the development of the soda process was mainly the perfection of details which would suit the conditions for which the fiber was to be used. Most of these improvements did not change the basic features of the process, but were designed to raise the yield or improve the quality of the pulp, the main object being, in general, to reduce the bleachability along with other improvements.

Research on the process during the last twenty years has been mainly along the line of a study of the effect of time, temperature, and amount and concentration of chemical upon the quality of the pulp. These studies have been limited largely to the conditions which give low yields of pulp with low bleachabilities. A few of the results of studies on American aspen wood will be included in this discussion for the purpose of indicating what yields have been obtained.

Sutermeister *(4)* studied the consumption of soda in the digestion of aspen woods, determining the free and total alkali in the black liquors after digestion. The conditions were varied within very wide limits, the steam pressure ranging from 70 to 130 pounds per square inch and the caustic soda added varying from 22 to 50 per cent of the dry weight of the wood. It was found that the yield of pulp seemed to be perfectly definite for any given consumption of soda, regardless of the manner in which such consumption was obtained. The conversion of wood from chips to fiber took place between 14 and 19.5 per cent caustic soda on the bone-dry weight of the wood, the yield being practically all chips below 14 per cent and all fiber above 19.5 per cent. The consumption of 15 per cent caustic soda (calculated on dry weight) seemed to represent a critical point below which the non-cellulosic components of the wood were chiefly dissolved, while beyond this point the residue, being nearly pure cellulose, was dissolved as a whole. Little was to be gained as to purity of product, therefore, by causing a consumption of over 15 per cent, although more severe treatment might impart certain desirable physical properties to the pulp. As far as bleaching qualities were concerned, the proportion of soda consumed had less influence than would have been expected, but it appeared that a digestion which terminated with a fair excess of free soda in the black liquor gave a more easily bleaching product than when the excess remaining was small.

Surface *(5)* made a very comprehensive study of the effects of time, temperature, and amount and concentration of chemical in cooking aspen wood by the soda process. As was the case in Sutermeister's work, it was found that severity of cooking was an effect mainly of the amount of caustic soda consumed per unit of wood. Increasing the amount or concentration of the chemical or the pressure of cooking produced a quicker reaction and hence one more complete in a given length of time. Increasing the duration resulted in a more complete reaction because of the longer time allowed for the available caustic soda to be consumed. Greater severity of cooking caused a decrease in the yield of crude pulp and usually of screened pulp, also. The amount of bleach required decreased with in-

creased severity of cooking, but a point was soon reached where the decrease in bleach required was not commensurate with the decrease in yield. Yields as high as 56 or 58 pounds of well-separated unbleached pulp were obtained per 100 pounds of aspen wood. Moreover, yields as high as 54 or 55 per cent were obtained, which required only 10 to 11 per cent of bleach. In conclusion, it was stated that aspen wood could be successfully cooked with a minimum of 20 to 25 pounds of caustic soda per 100 pounds of dry wood. The amount of this chemical actually consumed in the production of well-cooked, easily bleaching pulp varied from 18 to 24 pounds per 100 pounds of wood.

A very detailed study of the effect of caustic soda on the various constituents of aspen wood was made by Wells, Grabow, Staidl, and Bray *(6)* at the U. S. Forest Products Laboratory at Madison, Wisconsin. These investigators cooked aspen wood with 20 pounds caustic soda per 100 pounds of wood at a concentration of 96 grams per liter and a maximum temperature of 170 deg. C. One hour was required to reach the maximum temperature and in order to secure uniform samples, the cooks were blown at from one to seven hours. The progress of the cooks as reflected by the yield was very rapid, amounting to 18 per cent removal of the wood substance by the end of the first half hour or by the time when the cook had reached a temperature of 100 deg. C. At the end of two hours 42 per cent had been reduced, or 82 per cent of the total reduction at the end of seven hours. The curves showing the consumption of active alkali during the cook were, in general, the opposite of the yield figures. The rate of alkali consumption during the early stages of the cook was less than the reduction in yield. The pulps which bleached the most readily were obtained at the end of the fourth hour, further cooking causing the bleachability to increase. Whenever two cooks were made under the same conditions except for concentration of cooking liquor, the pulps obtained with the more dilute liquors bleached more easily. The fact that the cellulose was so rapidly dissolved at the start showed well the impossibility of obtaining yields approaching the Cross and Bevan cellulose yield on the wood. The lignin was dissolved very rapidly from the start, its removal being practically complete within three hours. After this period, further cooking reduced the pulp yield mainly by destroying the cellulose without increasing its purity. The pentosans seemed to form a part of the stable cellulose since they remained constant from the third to the seventh hour, while the total cellulose as determined by the Cross and Bevan method was reduced by more than 5 per cent.

II. The Chlorine Process.

The chlorine process for the manufacture of paper pulp from vegetable fibrous materials was developed almost simultaneously by de Vains in France and Cataldi and Pomilio in Italy. Neither of these countries has large forest stands, but both have available large supplies of straws and grasses, as well as cheap water power for the manufacture of chlorine and caustic soda.

In the de Vains process *(7, 8, 9, and 10)*, the straw is cooked with from 8 to 12 per cent of its weight of caustic soda at a concentration of from 12 to 14 grams per liter for four hours under about 30 pounds pressure. The pulp is then washed out of the digesters and disintegrated in a kneader. The washed fibers are dewatered to about 5 per cent consistency and pumped under pressure to a chlorine chamber into which chlorine water is also pumped. The process is continuous, the chlorine being nearly exhausted when the pulp leaves the chlorinating chamber. The excess chlorine and the acid formed by chlorination are neutralized with waste caustic soda from the cooking process, and the dissolved materials removed by washing. The pulp is then bleached with calcium hypochlorite until a satisfactory white color is obtained, this operation usually requiring from 2 to 3 per cent of chlorine.

In the Cataldi-Pomilio process *(11, 12, and 13)*, the straw is steeped in open tanks for about two hours in a 1 to 2 per cent solution of caustic soda. The fibers are then thoroughly disintegrated and carried to the chlorination chamber, where they are treated with chlorine gas and bleached by an intermittent batch system. The chlorinated pulps are then washed, first with water and then with alkali, after which they are bleached with 1 to 2 per cent of chlorine as calcium hypochlorite. This process was applied to poplar wood as well as to grasses, and gave about a 42 per cent yield of a pulp containing 75 per cent of alpha-cellulose. The literature is extremely sketchy as to the exact details of times and temperatures used in these processes.

Kang and Libby *(14)* applied the de Vains process to the pulping of birch and aspen woods, carrying out the preliminary alkaline treatment at 4, 8, 12, and 15 per cent of caustic soda for four hours. The pressure used was 30 pounds per square inch for the first two hours and 60 pounds per square inch for the last two hours. The chlorinations were made with 20, 25, 30, 35, and 40 per cent of chlorine on the weight of the air-dry chips, and lasted for ten hours. The consumption of chlorine on the dry weight of the wood decreased as the per cent of caustic soda in the preliminary treatment increased. Aspen wood treated with 8 per cent of caustic soda and 22 per cent of chlorine under the above conditions, gave a pulp of 45 per cent yield on the dry wood which bleached with 3.3 per cent of bleaching powder. When 4 per cent of caustic soda was used, the chlorine consumption was 25 per cent and a 46.5 per cent yield of pulp was obtained which bleached with 2.8 per cent of bleaching powder. The strength of the pulps at the various chlorine consumptions was higher than that of the soda pulp, being 2.5 times as strong in the case of the aspen. The color was also far superior, and the chlorinated pulp had the added property of being more flexible than normal soda pulp.

III. Processes Combining the Soda and Chlorine Processes.

Recently, patents have been taken out on modifications and combinations of the soda and chlorine processes. Haegglund *(15)* boiled a raw material such as beech wood with caustic soda until it was partially delignified and then treated it with chlorine in aqueous solution until a uniformly brown color was imparted to the mass. Hypochlorite was then added, thereby forming lower chlorine containing acids through the interaction of the hydrochloric acid formed by chlorination with the hypochlorite, which changed the color of the mass from brown to yellowish white. The pulp was then washed and bleached with calcium hypochlorite. A high yield of a good pulp was obtained in this manner.

Traquair and Rawling *(16)* treated a fibrous material such as chestnut, oak, or gumwood with an alkali metal sulphite and the salt of a weakly ionized polybasic acid such as sodium bicarbonate to effect partial defibering. The pulp was then treated with chlorine water at low consistency, after which it was dewatered and treated with chlorine gas at high consistency. After the reaction products had been washed out, the pulp could be bleached with

hypochlorite according to standard practice. The resulting white pulp was suitable for high grade book papers.

Runkel *(17)* worked out a process which was designed to produce a superior class of pulp from inferior woods. The method was tested with spruce, bamboo, pine, oak, and beech woods. The detailed data for beech wood were as follows: Standard beech wood chips were soaked for four hours in 2 per cent caustic soda at 100 deg. C., after which they were freed from bark and treated for an additional two hours at 100 deg. C. with 10 per cent caustic soda in 3 to 3.5 per cent solution. The treated material, after rod milling, gave 80 per cent good pulp and 2 per cent screenings on the basis of the original wood. The pulp was then treated with excess chlorine in 0.4 per cent caustic soda at 6 per cent consistency, was given a water and dilute caustic soda wash, and was again chlorinated, this time with no excess of chlorine, in 0.1 per cent caustic soda at 0.5 per cent consistency. The final product, of good color and strength, was obtained in yields of 50 to 55 per cent as against 30 and 40 per cent respectively by the standard soda and Mitscherlich processes.

Materials, Equipment, and Procedures

I. Materials.

The wood used in this study was sound aspen wood of from four to nine inches in diameter, grown in Wisconsin and secured from a local mill. One-half inch commercial chips were prepared from this wood by running it through the Institute of Paper Chemistry chipper. The chips were then screened on a 4-mesh screen to remove the fine material, and the slivers were removed by hand. The chips were allowed to air-dry to 85 or 90 per cent oven-dry before being placed in closed containers.

The caustic soda used was a commercial grade which contained 98.1 per cent NaOH and 0.2 per cent Na_2CO_3 as NaOH.

II. Equipment.

Three different types of equipment were used for making the soda digestion:

1. Stationary autoclaves heated by gas burners,
2. Rotary autoclaves heated by gas burners, and
3. A rotary digester heated by direct and indirect steam.

The stationary autoclaves were cylindrical in shape, being approximately 7 by 9½ inches inside diameter and holding about 5.5 liters. The thermometer well, which was $\frac{3}{16}$ of an inch in diameter and 5 inches in depth, was placed in the cover, as was also the pressure gauge. The pressure gauge and blow-off valve were connected to the cover with a ½ inch pipe. The cover was bolted on with eight ⅝ inch bolts, a lead gasket being used to insure a tight fit. The autoclave was supported by three 8 inch legs. A photograph of this piece of equipment is shown in Fig. 1.

Fig. 1

The rotary autoclaves were 30 inches in length, having an inside diameter of 10 inches and a capacity of 37 liters of 9.8 gallons. Each end was fitted with a valve and nipple for a hose connection, and in one end were placed a thermometer well and pressure gauge. The cover for filling and emptying the equipment was 4½ inches inside diameter, and was placed in the middle of the long dimension. The autoclave was supported on two tires and rotated at about one revolution per minute. A photograph of this type of autoclave is shown in Fig. 2.

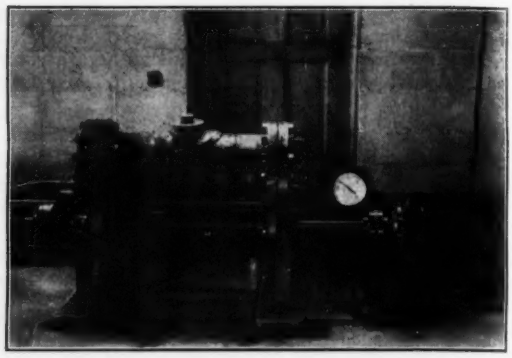

Fig. 2

The rotating digester was of the general shape of a commercial digester. It was six feet in height, having an inside diameter of 24 inches and a capacity of 98.9 gallons. It rotated about its long axis once in about every eight minutes, and was equipped with both pressure and temperature recording charts, the latter giving readings from the top and bottom of the digester. An ordinary pressure gauge was installed in the top cover, while at the bottom were placed a blow valve and connection to the blow pit so that the charge might be blown as in commercial operation. The piping arrangement was such that direct steam could be applied either at the bottom or at the top of the digester, or it could be used indirectly in the jacket.

The rod mill used for refining was one of the smallest commercial units built by the Allis-Chalmers Manufacturing Company of Milwaukee, Wisconsin. It was 4 by 6 feet in dimension and contained 80 two-inch rods weighing about two tons.

The screening of both bleached and unbleached pulps was done on a laboratory diaphragm screen manufactured by the Valley Iron Works Company of Appleton, Wisconsin, and equipped with a 14-cut screen plate. A photograph of this equipment is shown in Fig. 3.

The chlorination was done in a chlorinator which was a model of a patented piece of equipment. This apparatus consisted of a copper vessel having a capacity of about 25 liters, the bottom being made into the section of a cone by a filling on the inside of the copper vessel. A hollow cylinder with a similar cone-like bottom was fastened to the inside of the bleacher, the bottom of the inner cylinder being approximately two inches from the bottom of the outer cylinder and the difference in diameter between the inner and outer cylinder being about four inches. An impeller connected with a one-quarter horse power motor running at 3450 revolutions per minute was placed at the bottom of the inner cone. The pulp was drawn down through the inner cylinder and pushed up through the outer. Chlorine gas was led into the pulp through a glass tube with an outlet just above the impeller, agitation being so efficient that no chlorine escaped into the air.

The amount of chlorine introduced into the pulp was controlled by a Wallace and Tiernan chlorine control apparatus, which was guaranteed to give an accuracy of 4 per cent although one test made by titrating the chlorine after absorbing it in caustic soda showed it to have an accuracy of 1.4 per cent. A photograph showing the entire chlorinating set-up is shown in Fig. 4.

Second stage bleaching was done in crocks which were intermittently agitated by hand.

III. Experimental Procedure.

Three stationary autoclaves were run simultaneously, approximately 600 grams of oven-dry chips being placed in each to fill it about two-thirds full. The calculated amount of caustic soda was then added at a concentration sufficient to cover the chips completely, the chips being prevented from floating by a perforated metal plate which was pressed down upon them by hooks attached to the cover of the autoclave. About one hour was required to bring the charge to maximum pressure. During this time, pressure and temperature readings were taken every 15 minutes; thereafter, readings were taken every half hour. At the end of the cooking period, the steam pressure was relieved through the top relief valve and sufficient of the liquor blown off at this point was saved for analysis. The contents of the three autoclaves were then dumped together into a box with a Fourdrinier wire bottom and washed until free from black liquor.

A similar procedure was used with the rotary autoclaves, except that water was introduced as soon as the steam pressure had been blown down and the pulp was washed in the digester before dumping.

Indirect steam was used in the rotating digester until pressure was reached, in order to avoid too much condensation. Rotation was continuous during this period, after which single rotations were made every half hour. At the end of the cooking time, the digester was blown at full pressure and the contents washed until free from black liquor.

The softened chips from the autoclave cooks were broken down into a pulp in the 1½ pound Valley beater. A ball mill was tried for this purpose, but it was found that the weight of the balls was not great enough to give the desired results. Standard conditions were not maintained during this part of the procedure, since the operation would be accomplished by blowing if a commercial digester were being used. In the commercial procedure, the further reduction to a pulp would be achieved by a rod mill. The beater, due to its cutting action, is not a desirable type of equipment for this kind of work.

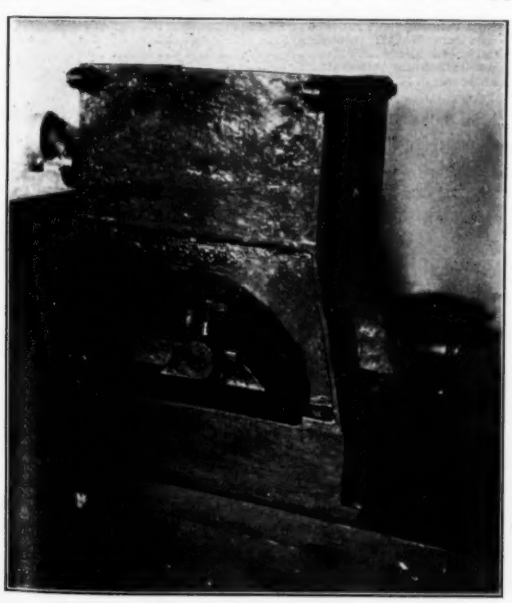

Fig. 3

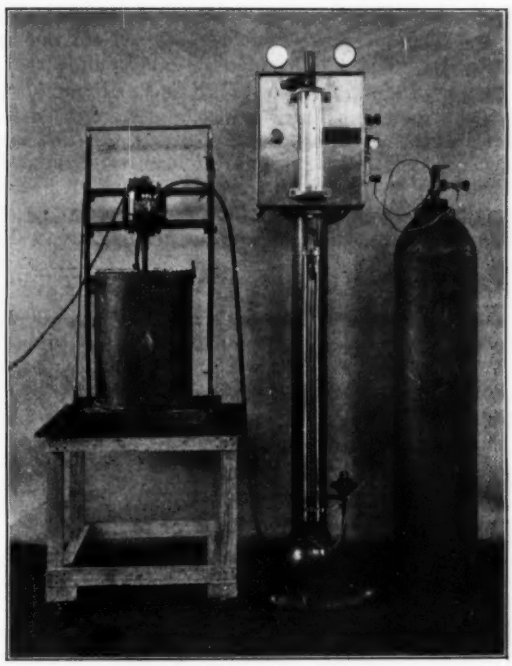

Fig. 4

The disintegrated pulp was then washed through a 2-mesh screen for the removal of any undisintegrated chips and the screened material placed in the laboratory chlorinator. The density in this apparatus was 2.75 per cent, chlorine being led into the mass at the rate of 1.42 grams per minute as long as it was readily absorbed by the pulp. This point was determined by the smell and furnished a very good criterion for the end of the operation. The chlorinated stock was then treated with an amount of caustic soda equivalent to 1.13 times the weight of chlorine and allowed to stand for one-half hour. After this, the pulp was dumped on to a fine screen, washed to remove the chlorinated products, and squeezed out to about 15 per cent consistency. The temperature was raised to 35 deg. C. and an amount of chlorine added as hypochlorite bleach equivalent to the amount used as gas in the first stage. During this operation, the mass was intermittently stirred by hand. After three or four hours, when the bleach was nearly exhausted, the residues were washed out on a fine screen. This stock was then run through the laboratory screen to determine screenings, after which it was air-dried for strength and chemical tests.

IV. Physical Testing.

Strength tests were made in the one and one-half pound Valley beater under the following conditions: 340 grams of air-dry bleached pulp were allowed to soak over night. The mass was then placed in the beater, the total volume amounting to 17 liters. The stock was allowed to circulate for five minutes before the first sample was taken. 22 pounds total weight were used, or 18 pounds plus 4 pounds to balance the bedplate. Two samples for strength test sheets and one sample for freeness were taken. The strength test hand sheets were made on a basis weight of 30 pounds (24 x 36 - 480) on a sheet mould which was 6½ inches square. The strength test sample was diluted to 2 liters, poured four times from one cup to another, and then poured into the sheet mould, where there was suf-

ficient water to fill the mould after the addition of the sample. The sheet was couched, pressed for one minute between dry felts at 100 pounds pressure, and dried without turning under a heavy wet felt and a 10 pound weight. The sheets were cut 5 by 5 inches, and were dried for five minutes in the weighing oven at 70 deg. C. The bursting strength was determined on the Mullen tester and expressed as points Mullen per pound per ream. The freeness sample was diluted to 1 liter with water at 20 deg. C., and the freeness determined on the Schopper-Riegler tester.

The contrast ratio on hand sheets was measured by the Davis opacimeter, which is a new type of instrument developed by M. N. Davis of the Kimberly-Clark Corporation and built by the Bausch & Lomb Optical Company of Rochester, New York.

The color readings on the bleached pulps were obtained by the use of the Hess-Ives tint photometer.

V. Chemical Testing.

The black liquor analyses were made according to the method of Sutermeister and Rafsky *(18)*.

The unbleached pulps were analyzed for lignin and Cross and Bevan cellulose by the methods of the Forest Products Laboratory *(19)*.

The bleached pulps were analyzed for lignin, cellulose, 1 per cent caustic soda solubility, and pentosan content by the methods of the Forest Products Laboratory *(19)*. The copper numbers were determined by the Schwalbe-Braidy method *(20)*, while the method of Bialkowsky was used for the determination of cuprammonium viscosity *(21)*. Alpha-cellulose determinations were made according to the method of the Technical Association of the Pulp and Paper Industry *(22)*. (TAPPI Standard T203m).

Discussion of Experimental Procedure

I. The Wood.

As stated above, the type of wood used in this study was sound aspen wood from four to nine inches in diameter and grown in Wisconsin. Upon analysis, this wood was found to have the following composition:

TABLE I
ANALYSIS OF ASPEN WOOD

	1	2	Average
Alcohol-Benzene Solubility	3.09	2.83	2.96
1 per cent NaOH Solubility	18.8	19.0	18.9
Lignin	22.4	22.2	22.3
Pentosans	20.8	19.9	20.4
Cellulose (Cross and Bevan)	64.4	63.9	64.2
Pentosans in Cellulose	22.8	...	22.8
Ash	0.79	0.74	0.77

II. Commercial Pulping Conditions.

The first cooks were made under conditions as nearly commercial as possible, in order to secure a basis for comparison of the cooks made under less drastic conditions. A number of soda mills gave the following conditions for commercial cooks and yields by the soda process:

TABLE II
COMMERCIAL PULPING CONDITIONS

Mill No.	1	2
Time in hours:		
Total	5½	5
At pressure	4	3
Concentration in grams per liter	100	95
Per cent NaOH used on oven-dry wood	22–23	25
Maximum pressure in pounds per square inch	115	90
Per cent bleach required	6–8	10–11
Per cent yield of bleached pulp based on wood	45	45

III. Standard Autoclave Cooks Under Commercial Alkaline Pulping Conditions.

The following conditions were taken as an average of the above, and the three cooks were then made under these conditions:

Maximum pressure..... 110 pounds per square inch (176 degrees Centigrade)
Concentration ..... 100 grams per liter
Amount of Chemical..... 25 pounds per 100 pounds of wood
Time to pressure..... 1 hour
Time at pressure..... 4¼ hours

The first two cooks were duplicate ones made in the stationary autoclaves. It was impossible to use a concentration higher than 50 grams per liter in this case and still keep the chips covered. A third cook was therefore made in the rotary autoclave in order to determine the effect of this factor. The data and results covering these test cooks are shown in Table III.

TABLE III
AUTOCLAVE COOKS MADE UNDER COMMERCIAL ALKALINE PULPING CONDITIONS

Cook No.	3	4	23
Cooking Data:			
Time in hours:			
Total	5½	5½	4¾
At pressure	4¼	4¼	4¼
Concentration in grams per liter	50.0	45.4	100.0
Maximum pressure in pounds per square inch	115	115	115
Per cent NaOH used on oven-dry wood	25	25	25
Per cent yield based on oven-dry wood	49.8	49.7	45.0
Per cent causticity of black liquor	24.0	26.2	22.1
Per cent NaOH consumed on oven-dry wood	19.0	18.5	19.5
Bleaching Data:			
Per cent bleach consumed as hypochlorite:			
First stage—Chlorine gas	8.0	8.9	5.8
Second stage—Bleach liquor	2.9	2.6	6.7
Total	10.9	11.5	12.5
Per cent yield bleached pulp based on unbleached	97.8	96.3	95.0
Per cent screenings in bleached pulp	3.02	0.4	0.0
Per cent yield bleached screened pulp based on wood	47.3	47.9	42.8
Color Data:			
Hess-Ives colors:			
Blue	....	....	77
Green	....	....	81
Red	....	....	84
Strength Data:			
Mullen at 15 minutes	25	18	13
Maximum Mullen	59	59	33
Time of maximum Mullen in minutes	60	90	30
Freeness at maximum Mullen	450	300	510
Chemical Test Data:			
Unbleached:			
Lignin	1.7	2.3	2.0
Cellulose (Cross and Bevan)	96.5	97.1	95.3
Bleached:			
Lignin	0.6	0.9	1.53
Cross and Bevan cellulose	97.7	98.6	96.6
Alpha-cellulose	82.4	82.1	71.2
1 per cent NaOH solubility	5.4	6.5	10.0
Copper number	1.21	1.32	3.14
Cuprammonium viscosity	6.2	9.8	4.1
Pentosan	17.5	17.1	15.7

These results check fairly closely with those which are given as being typical of commercial operation. The pulp cooked at a concentration of 100 grams per liter was somewhat over-cooked, as is shown by the loss in yield and by the low strength and chemical constants.

IV. Autoclave Cooks to Determine Optimum Conditions for Obtaining a High Yield of Pulp by the Use of Dilute Liquors and Chlorination Bleaching.

The results indicated in the literature cited have shown that the yield in cooking aspen wood by the soda process is dependent mainly upon the amount of caustic soda used. Since so much of the cellulosic material is dissolved by the ordinary cooking process, however, it seems logical to assume that a more dilute liquor and a lower cooking temperature would assist in the attempt to raise the yield of cellulose, even though the cooking time were lengthened sufficiently to remove most of the ligneous materials. With this in mind, a series of cooks was made in the stationary autoclaves, the times, temperatures, and concentrations and amounts of chemical being so regulated as to give a pulp

of maximum yield with a minimum chlorine consumption. Low concentrations and low temperatures were used throughout these cooks.

The results and data covering this series of cooks are shown in Table IV.

Of the above cooks, those having a yield of from 60 to 62 per cent of the original wood seemed to be the most desirable. The chips from these cooks were softened sufficiently to permit them to be broken up easily by a rod milling treatment, as will be shown definitely later on in this discussion. This was not the case, however, with the chips from the cooks giving a higher yield, or from 65 to 68 per cent; these chips were very hard and would be broken up with difficulty by a rod milling treatment. The bleach consumption was also much higher, while the yield upon bleaching was so much lower that little advantage was obtained.

Several methods of securing a yield of from 60 to 62 per cent are shown. Of these, the method using 16 pounds of alkali per 100 pounds of wood at 100 pounds pressure for 3¼ hours is considered the most desirable because of the saving in time and chemical (Cook No. 14). The possibility of another type of cook which would give a fairly high yield with a still lower bleachability is also shown (Cook No. 5). In this case, the chips are sufficiently softened so that a rod milling treatment would not be necessary.

In general, the amount of alkali consumed bears out Sutermeister's contention that the yield within a reasonable cooking range is a function of that variable.

The physical and chemical tests on the pulps give results which are very much the same over the entire series.

V. Autoclave Cooks Using Black Liquor for Dilution of Cooking Liquor.

The very dilute concentrations used in the above cooks would be handled with difficulty in a commercial recovery system. In order to make the process commercially feasible, therefore, it would be necessary to re-use a large portion of the black liquor for the succeeding cook.

In this study, two cooks were carried out using black liquor to make up the cooking liquor volume in order to determine what the effect would be upon the cooking conditions and upon the yield and quality of the pulp produced. The conditions for cooking were the same as those used in Cook No. 10. In the first black liquor cook (No. 15), 2 liters of black liquor containing 6.1 grams per liter of free NaOH and 27.3 grams per liter of total soda were used for dilution, the amount of free NaOH in the black liquor being deducted from the amount of NaOH to be added. This procedure resulted in a higher yield than was obtained when the full amount of NaOH was added as fresh liquor. A second cook was therefore made (No. 16), which did not take into consideration the free alkali in the black liquor and in which the black liquor used for dilution contained 7.2 grams per liter of free NaOH and 37.0 grams per liter of total soda.

The results of these cooks as compared with a cook made without black liquor are given in Table V.

TABLE V

AUTOCLAVE COOKS USING BLACK LIQUOR FOR DILUTION OF COOKING LIQUOR

Cook No.	15	16	10
Cooking Data:			
Time in hours:			
Total	6¼	6¼	6
At pressure	5¼	5¼	5¼
Concentration in grams per liter	30.0	30.0	30.0
Maximum pressure in pounds per square inch	80	80	80
Per cent NaOH used on oven-dry wood	16	18	18
Per cent yield based on oven-dry wood	65.9	61.9	**61.2**
Per cent causticity of black liquor	18.8	....	27.5
Per cent NaOH consumed on oven-dry wood	12.4	....	**13.1**
Bleaching Data:			
Per cent bleach consumed as hypochlorite:			
First stage—Chlorine gas	20.3	15.4	13.9
Second stage—Bleach liquor	19.6	15.4	13.9
Total	39.9	30.8	27.8
Per cent yield bleached pulp based on unbleached	90.3	93.0	92.7
Per cent yield bleached pulp based on wood	59.4	57.5	56.8
Color Data:			
Hess-Ives colors:			
Blue	70	71	75
Green	78	80	81
Red	82	83	83
Strength Data:			
Mullen at 15 minutes	....	32	23
Maximum Mullen	....	89	108
Time of maximum Mullen in minutes	....	60	75
Freeness at maximum Mullen	....	320	300
Chemical Test Data:			
Unbleached:			
Lignin	9.8	7.5	7.2
Cellulose (Cross and Bevan)	88.0	90.8	90.9
Bleached:			
Lignin	1.24	1.78	1.88
Cross and Bevan cellulose	96.4	97.2	96.7
Alpha-cellulose	79.6	82.7	83.7
1 per cent NaOH solubility	9.9	9.3	8.4
Copper number	2.73	2.66	2.16
Cuprammonium viscosity	13.3	14.0	14.4
Pentosan	19.1	19.7	18.6

TABLE IV.—AUTOCLAVE COOKS USING DILUTE LIQUORS

Cook No.	1	9	12	13	14	2	5	6	7	8	10	11
Cooking Data:												
Time in hours:												
Total	5¾	5½	7	5¾	5¾	5¾	5½	6½	6½	6¼	6	6¾
At pressure	4½	4½	6	4¾	4¼	4½	4¼	5½	5½	5¼	5¼	6
Concentration in grams per liter	30.2	27.2	27.2	27.2	27.2	29.4	30.2	30.0	27.7	29.2	30.0	29.9
Maximum pressure in pounds per square inch	80	80	80	100	100	80	80	80	80	80	80	60
Per cent NaOH used on oven-dry wood	16	16	16	16	16	18	18	18	18	18	18	18
Per cent yield based on oven-dry wood	65.3	68.0	61.4	57.4	61.2	62.7	56.5	58.8	60.7	60.3	61.2	65.4
Per cent causticity of black liquor	12.3	19.3	21.3	19.6	19.7	18.4	10.5	24.1	23.1	26.5	27.5	34.7
Per cent NaOH consumed on oven-dry wood	14.1	12.9	12.6	12.8	12.9	14.7	16.2	13.7	13.8	13.2	13.1	12.0
Bleaching Data:												
Per cent bleach consumed as hypochlorite:												
First stage—Chlorine gas	25.7	23.6	18.5	12.3	15.8	25.1	9.2	12.8	15.1	13.9	13.9	22.3
Second stage—Bleach liquor	17.3	21.9	12.7	11.8	16.0	17.3	9.7	13.5	11.4	11.7	13.9	23.5
Total	43.0	45.5	31.2	24.1	31.8	42.4	18.9	26.3	26.5	25.6	27.8	45.8
Per cent yield bleached pulp based on unbleached	90.5	89.4	91.2	94.5	91.2	94.0	95.6	93.8	91.0	93.5	92.7	89.2
Per cent yield bleached pulp based on wood	59.1	60.8	56.0	54.3	55.8	59.0	54.0	55.2	55.2	56.4	56.8	58.4
Color Data:												
Hess-Ives colors:												
Blue	69	71	76	73	73	63	66	....	72	70	75	74
Green	76	77	81	80	79	71	76	....	80	78	81	79
Red	80	80	84	83	82	72	78	....	82	81	83	83
Strength Data:												
Mullen at 15 minutes	....	....	35	19	22	32	25	30	31	32	23	28
Maximum Mullen	....	....	108	100	109	93	80	83	82	73	108	105
Time of maximum Mullen in minutes	....	....	75	90	90	75	75	60	75	60	75	75
Freeness at maximum Mullen	....	....	280	430	340	250	350	390	340	320	300	410
Chemical Test Data:												
Unbleached:												
Lignin	10.2	11.3	9.0	6.6	7.2	7.9	5.1	5.5	8.8	8.5	7.2	11.7
Cellulose (Cross and Bevan)	90.1	85.8	90.2	90.0	90.7	92.1	94.2	91.4	90.3	91.0	90.9	87.5
Bleached:												
Lignin	1.7	1.94	1.26	1.45	2.18	1.4	1.6	1.9	1.1	1.77	1.88	1.88
Cross and Bevan cellulose	97.9	96.2	97.9	97.9	97.9	96.0	97.2	97.8	96.2	96 3	96.7	96.5
Alpha-cellulose	81.7	81.9	84.5	85.4	84.6	82.4	81.2	84.8	81.6	83.6	83.7	80.9
1 per cent NaOH solubility	5.3	8.0	6.0	6.6	7.5	5.6	8.7	5.9	9.0	8.6	8.4	9.5
Copper number	1.16	2.05	1.76	1.63	1.99	1.57	1.63	1.58	1.91	1.93	2.16	2.6
Cuprammonium viscosity	22.7	18.6	16.1	11.9	15.1	26.7	15.0	13.4	13.7	12.4	14.4	13.7
Pentosan	18.3	19.7	19.0	20.0	19.7	19.6	19.0	19.1	19.7	20.0	18.6	19.4

The black liquor had very little effect upon the yield of pulp, and the bleachability was affected only slightly. The strength of the pulp was not quite as high, although the chemical constants were very much the same. Moreover, there was a slight evidence of a greater degradation in the case of the cooks which contained the black liquor. However, the indications seemed to be that the black liquor could be used for dilution in place of water with very little ill effect.

VI. Experimental Cooks in the One Hundred Pound Rotary Digester.

A. With Rotation.

All of the cooks described thus far were made in the stationary autoclaves. One drawback in the use of this apparatus, however, was the fact that they could not be blown at the end of the cooking operation. If a cooking process is to be worthy of commercial consideration, the chips must be soft enough to be blown from the digester at the end of the cook and to be disintegrated by this operation. For this reason, a cook was made in the 100 pound rotary digester. An added advantage in this procedure was that a sufficient amount of raw pulp could thus be obtained for proper refining in the rod mill, which in turn would give a real index of the amount of waste in the form of screenings from the very raw cooks. The results of this cook as compared with a stationary autoclave cook are given in Table VI.

The concentration at the beginning of the cook was raised somewhat in order to compensate for the condensation of the live steam introduced. There was no difficulty in blowing the pulp from the digester, and it appeared to be well defibered, with no chips remaining. The screening test gave 30.6 per cent screenings in the weight of the pulp.

15 pounds of the pulp were then run through the rod mill, which was a continuous operation requiring half an hour. The pulp thus refined lost most of its fiber bundles, and the screenings were reduced to 2.6 per cent on the basis of the pulp.

The yield, alkali consumption, and bleachability secured in this cook were very similar to that obtained in the cook made in the stationary autoclaves, although the pulp from the digester cook was bleached to a higher color than the pulp from most of the autoclave cooks. For this reason, the alpha-cellulose content and cuprammonium viscosity were somewhat lower, while the 1 per cent soda solubility and copper numbers are somewhat higher. The rate of chemical consumption in the large rotary digester was followed by titrating samples of black liquor every hour. The results of these titrations are shown in Table VII and in Fig. 5:

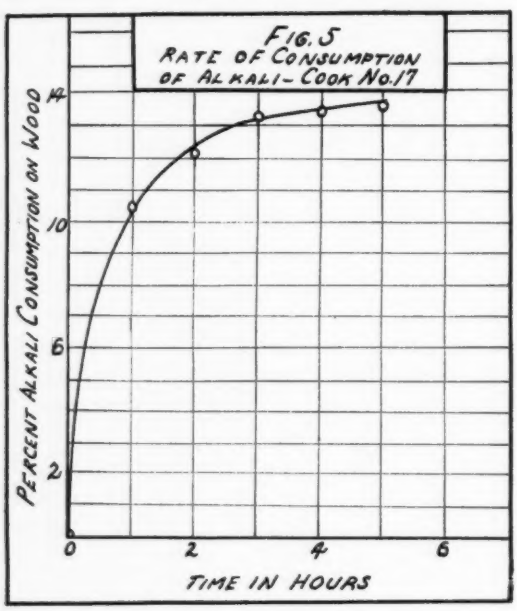

Fig. 5

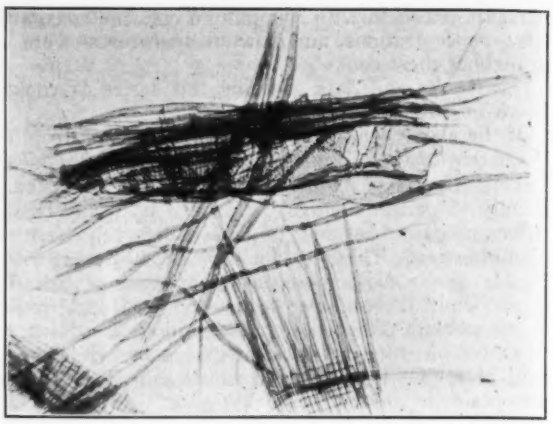

Fig. 6

No. 17 Cook as blown × 100.

TABLE VII

RATE OF CONSUMPTION OF ALKALI

Cook No. 17

Time in Hours	Per Cent Causticity of Black Liquor	Per Cent Alkali Consumption on Wood
1	35.4	10.4
2	24.2	12.1
3	17.2	13.3
4	16.4	13.4
5	14.5	13.7

The alkali was very rapidly consumed at the start of the cook, but little more being consumed after the second hour at pressure.

TABLE VI

COMPARISON OF COOK MADE IN ROTATING DIGESTER USING ROTATION FOR CIRCULATION WITH COOK MADE IN STATIONARY AUTOCLAVE

Cook No.	17	14
Cooking Data:		
Time in hours:		
Total	5¼	5¼
At pressure	4¼	4¼
Concentration in grams per liter	35.0	27.2
Maximum pressure in pounds per square inch	100	100
Per cent NaOH used on oven-dry wood	16	16
Per cent yield based on oven-dry wood	61.2	61.2
Per cent causticity of black liquor	14.5	19.7
Per cent NaOH consumed on oven-dry wood	13.7	12.9
Bleaching Data:		
Per cent bleach consumed as hypochlorite:		
First stage—Chlorine gas	16.8	15.8
Second stage—Bleach liquor	16.8	16.0
Total	33.6	31.8
Per cent yield bleached pulp based on unbleached	90.9	91.2
Per cent yield bleached pulp based on wood	55.6	55.8
Color Data:		
Hess-Ives colors:		
Blue	75	73
Green	79	79
Red	81	82
Strength Data:		
Mullen at 15 minutes	23	22
Maximum Mullen	57	109
Time of maximum Mullen in minutes	60	90
Freeness at maximum Mullen	240	340
Chemical Test Data:		
Unbleached:		
Lignin	7.5	7.2
Cellulose (Cross and Bevan)	92.4	90.7
Bleached:		
Lignin	1.98	2.18
Cross and Bevan cellulose	96.0	97.9
Alpha-cellulose	74.6	84.6
1 per cent NaOH solubility	13.9	7.5
Copper number	4.49	1.99
Cuprammonium viscosity	7.5	15.1
Pentosan	17.6	19.7

The accompanying photomicrographs show very well the degree of delignification of the fibers in the various stages of purification. At the end of the cooking operation, there are still large bundles of fibers being held together by medullary rays (Fig. 6). These bundles are largely removed by the rod milling treatment (Fig. 7). After chlorinating and treating with alkali and bleach, the bundles are entirely removed and a uniformly defibered pulp results (Fig. 8).

This cook indicated two things: first, that a pulp of a yield of 60 per cent based on the wood could be blown successfully from a digester having a two inch blow line; and secondly, that the screenings in the pulp could be reduced very readily by a rod milling treatment. It would not be necessary to reject any of the pulp, since the rejects from each screening could be returned to the rod mill with the succeeding batch of pulp. In this way, practically none of the unbleached pulp would be lost.

B. Without Rotation.

The preceding cook has shown that wood chips may be cooked to a high yield by the use of dilute liquors in a rotating digester. However, since soda mills do not employ rotating digesters, it was considered desirable to determine whether the cooking would be as uniform and satisfactory in a stationary digester. Commercial soda digesters are normally provided with circulating pumps or other devices for securing circulation of the cooking liquor during the cook. Although the experimental rotating digester used in this investigation was not provided with such a device, no difficulty was experienced in securing a uniform and well cooked pulp.

TABLE VIII

COMPARISON OF COOK MADE IN ROTATING DIGESTER WITHOUT ROTATION WITH COOK MADE IN STATIONARY AUTOCLAVE

Cook No.	18	5
Cooking Data:		
Time in hours:		
Total	5¼	5¼
At pressure	4¼	4¼
Concentration in grams per liter	35.0	30.2
Maximum pressure in pounds per square inch	100	100
Per cent NaOH used on oven-dry wood	18	18
Per cent yield based on oven-dry wood	57.2	56.5
Per cent causticity of black liquor	13.3	10.5
Per cent NaOH consumed on oven-dry wood	15.6	16.2
Bleaching Data:		
Per cent bleach consumed as hypochlorite:		
First stage—Chlorine gas	11.4	9.2
Second stage—Bleach liquor	11.4	9.7
Total	22.8	18.9
Per cent yield bleached pulp based on unbleached	93.9	95.6
Per cent yield bleached pulp based on wood	53.7	54.0
Color Data:		
Hess-Ives colors:		
Blue	80	66
Green	84	76
Red	88	78
Strength Data:		
Mullen at 15 minutes	43	25
Maximum Mullen	65	80
Time of maximum Mullen in minutes	60	75
Freeness at maximum Mullen	440	350
Chemical Test Data:		
Unbleached:		
Lignin	5.1	5.1
Cellulose (Cross and Bevan)	95.1	94.2
Bleached:		
Lignin	2.39	1.6
Cross and Bevan cellulose	96.8	97.2
Alpha-cellulose	74.6	81.2
1 per cent NaOH solubility	13.8	8.7
Copper number	4.31	1.63
Cuprammonium viscosity	7.2	15.0
Pentosan	17.7	19.0

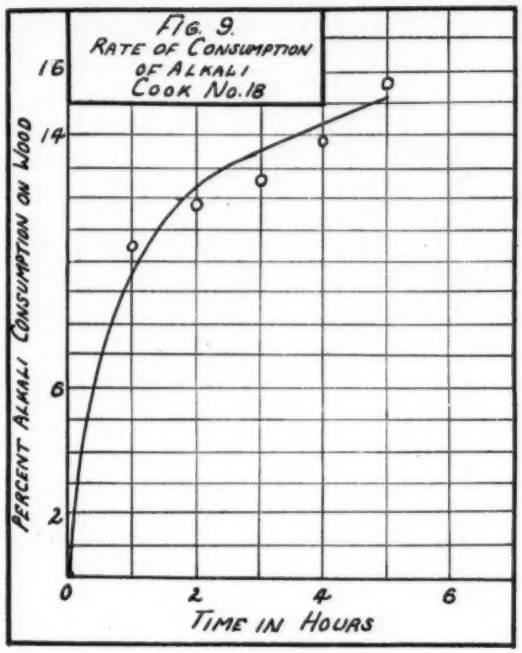

FIG. 9

This cook was made in the rotating digester without rotation, the conditions being the same as for Cook No. 5. These conditions, when employed in the stationary autoclaves, gave a moderately soft pulp having a fairly low bleachability. When applied to the cook in the rotating digester, a pulp should be produced having a low percentage of screenings when blown, providing the chips are uniformly cooked, in which case the rod milling treatment would be unnecessary.

The results obtained in this cook as compared with those secured in Cook No. 5 are shown in Table VIII.

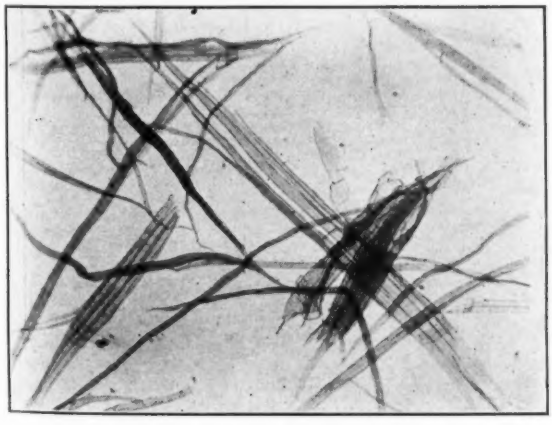

FIG. 7
No. 17 Cook after rod milling × 100.

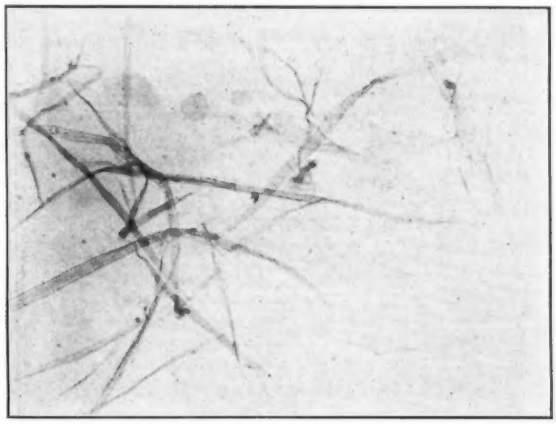

FIG. 8
No. 17 Cook after bleaching × 100.

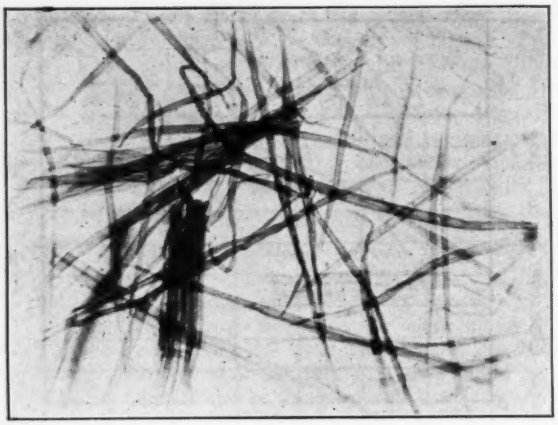

FIG. 10
No. 18 Cook as blown × 100.

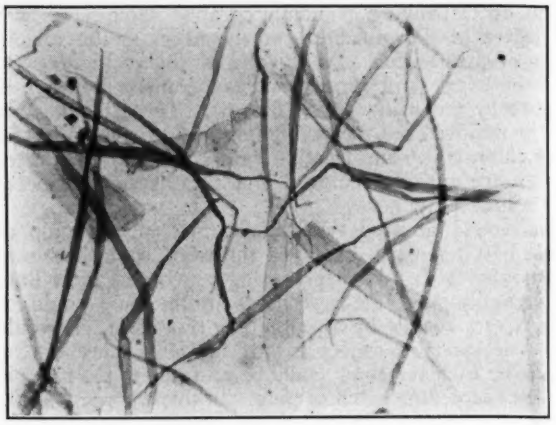

FIG. 11
No. 18 Cook after bleach × 100.

Cook No. 18 shows that a uniform delignification of wood chips can be accomplished by the use of a dilute cooking liquor even when there is no forced circulation. This cook gave a high yield of a pulp which had a fairly low bleachability. Since the screenings amounted to but 2.6 per cent of the unbleached pulp, a cook of this kind would be desirable if a rod mill were not available for the refining of screenings.

The strength and chemical constants on this pulp were somewhat low because of the very high color to which it was bleached. The rate of consumption of alkali during this cook is indicated in Table IX and in Fig. 9.

TABLE IX
RATE OF CONSUMPTION OF ALKALI
Cook No. 18

Time in Hours	Per Cent Causticity of Black Liquor	Per Cent Alkali Consumption on Wood
1	41.7	10.5
2	33.8	11.9
3	30.1	12.6
4	22.8	13.9
5	13.3	15.6

The above curve for alkali consumption during Cook No. 18 is very similar to the curve for Cook No. 17, the amount of alkali actually consumed being practically the same up to the end of the fourth hour. This indicates that the additional 2 per cent in this case does not enter into the reaction until very near the end of the cook. In other words, the rate of cooking is mainly dependent upon the concentration at any given pressure rather than upon the amount of chemical used.

The accompanying photomicrographs of pulp from Cook No. 18 shows that the pulp is very well defibered, having but a few small fiber bundles left (Fig. 10). These are entirely removed by the subsequent bleaching operation (Fig. 11). Samples of bleached and unbleached commercial pulp are also shown (Figs. 12 and 13) for comparison with these and the preceding photomicrographs.

VII. ROTARY AUTOCLAVE COOKS USING HIGH CONCENTRATIONS AND A SHORT COOKING TIME.

In order to check further the contention that a uniform delignification of the wood is possible only through the use of dilute liquors, a cook was made in the rotary autoclave using commercial conditions except that the time was cut short. This type of cook should show the effect of concentrated liquors upon the wood and still, as a result of the short cooking period, give a high yield.

Simultaneously, a cook with dilute liquors was carried out, in order to compare the results obtained in this type of equipment with those previously secured.

The results and data covering this series of cooks are given in Table X.

Cook No. 25 gave a yield very much the same as that obtained in Cooks No. 14 and No. 17, which would indicate that the change in equipment made but a slight difference. Cook No. 24 gave a fairly low yield even in the very short time during which it was cooked. The wood was not uniformly cooked, the screenings in this case consisting of the centers of chips which apparently were not cooked at all. The pulp had a comparatively high bleachability for the

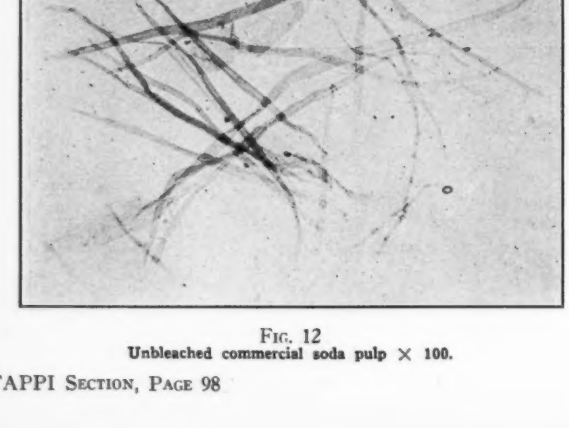

FIG. 12
Unbleached commercial soda pulp × 100.

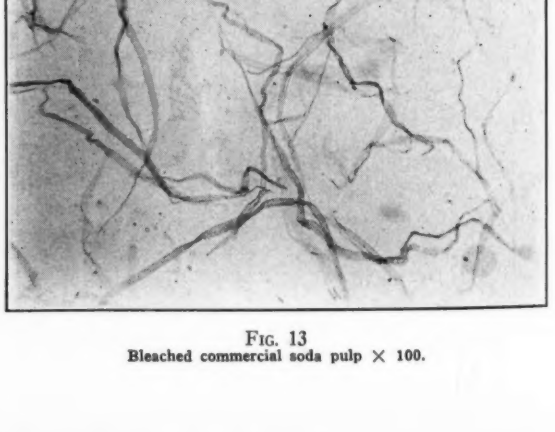

FIG. 13
Bleached commercial soda pulp × 100.

TABLE X
ROTARY AUTOCLAVE COOKS USING HIGH CONCENTRATIONS AND A SHORT COOKING TIME

Cook No.	24	25
Cooking Data:		
Time in hours:		
Total	1⅓	5¼
At pressure	¾	4¼
Concentration in grams per liter	100.0	30.0
Maximum pressure in pounds per square inch	100	100
Per cent NaOH used on oven-dry wood	25	16
Per cent yield based on oven-dry wood	51.8	59.4
Per cent causticity of black liquor	40.5	14.6
Per cent NaOH consumed on oven-dry wood	14.9	13.6
Bleaching Data:		
Per cent bleach consumed as hypochlorite:		
First stage—Chlorine gas	9.3	....
Second stage—Bleach liquor	9.8	....
Total	19.1	....
Per cent yield bleached pulp based on unbleached	92.5	....
Per cent yield bleached pulp based on wood	47.9	....
Color Data:		
Hess-Ives colors:		
Blue	77	....
Green	80	....
Red	84	....
Strength Data:		
Mullen at 15 minutes	35	....
Maximum Mullen	48	....
Time of maximum Mullen in minutes	45	....
Freeness at maximum Mullen	600	....
Chemical Test Data:		
Unbleached:		
Lignin	4.2	....
Cellulose (Cross and Bevan)	93.4	....
Bleached:		
Lignin	2.21	....
Cross and Bevan cellulose	97.5	....
Alpha-cellulose	81.0	....
1 per cent NaOH solubility	8.7	....
Copper number	2.34	....
Cuprammonium viscosity	6.2	....
Pentosan	16.2	....

yield. Comparing it with Cook No. 5, the lignin content and bleachability were about the same, but the yield was approximately 5 per cent lower due to the greater dissolving power of the more concentrated liquor on the cellulose.

VIII. Autoclave Cooks Using a Dilute Kraft Liquor.

It has been shown that aspen wood may be uniformly delignified by the use of dilute soda liquors. Since some mills use a kraft liquor consisting of two parts of sodium hydroxide to one part of sodium sulphide while other use a modified soda process in which a few pounds of sodium sulphide are employed, it was considered desirable to determine the effect of a dilute liquor of this type upon aspen wood. It has been found that a kraft liquor has a more rapid delignifying action and will give a pulp of a lower bleachability and a lower lignin content in a given time *(6)*. At the same time, the cellulose is attacked less.

TABLE XI
AUTOCLAVE COOKS USING A DILUTE KRAFT LIQUOR

Cook No.	19	20	14
Cooking Data:			
Time in hours:			
Total	5¼	5¼	5¼
At pressure	4¼	4¼	4¼
Concentration in grams per liter	27.2	27.2	27.2
Maximum pressure in pounds per square inch	100	100	100
Per cent NaOH used on oven-dry wood	10.66	10.66	16.0
Per cent Na_2S used on oven-dry wood	5.33	5.33	0.0
Per cent yield based on oven-dry wood	59.6	60.4	61.2
Per cent causticity of black liquor	8.1	....	19.7
Per cent NaOH consumed on oven-dry wood	14.7	....	12.9
Bleaching Data:			
Per cent bleach consumed as hypochlorite:			
First stage—Chlorine gas	13.5	....	15.8
Second stage—Bleach liquor	13.8	....	16.0
Total	27.2	....	31.8
Per cent yield bleached pulp based on unbleached	90.5	....	91.2
Per cent yield bleached pulp based on wood	53.9	....	55.8
Color Data:			
Hess-Ives colors:			
Blue	71	....	73
Green	78	....	79
Red	81	....	82
Strength Data:			
Mullen at 15 minutes	13	....	22
Maximum Mullen	67	....	109
Time of maximum Mullen in minutes	90	....	90
Freeness at maximum Mullen	380	....	340
Chemical Test Data:			
Unbleached:			
Lignin	5.7	....	7.2
Cellulose (Cross and Bevan)	92.0	....	90.7
Bleached:			
Lignin	1.48	....	2.18
Cross and Bevan cellulose	97.4	....	97.9
Alpha-cellulose	81.5	....	84.6
1 per cent NaOH solubility	7.5	....	7.5
Copper number	1.98	....	1.99
Cuprammonium viscosity	15.5	....	15.1
Pentosan	17.4	....	19.7

The results of duplicate cooks using a kraft liquor as compared with one using a straight soda liquor are given in Table XI.

These results show that the reaction is a little more rapid in a cook using a kraft liquor. Moreover, the alkali added at the beginning of the cook is more completely consumed, while the yield and bleachability are somewhat lower. The difference between these cooks and the straight soda cooks is not very great, being comparable in no way to the difference in results obtained when spruce is cooked by the normal kraft process in comparison with the soda process.

IX. The Advantages of a Two Stage Chlorination Bleaching over a Single Stage Hypochlorite Bleaching.

Earlier experiments *(23)* in the laboratories of the Institute of Paper Chemistry have established the fact that the type of bleaching such as has been used in this investigation is very beneficial for the preservation of the strength and chemical qualities of kraft paper. For this reason and in order to show that this kind of a bleaching operation was necessary in bleaching a pulp of such a high bleachability as has been produced, a comparison of the effects of single stage hypochlorite bleaching and two stage chlorination bleaching was carried out with one of the experimental cooks as well as with a commereial pulp.

The results of this comparison are indicated in Table XII, which includes also the analytical and physical data on a commercially bleached pulp.

These results indicate that two stage chlorination bleaching is very beneficial for this type of soda pulp, insofar as consumption of chlorine is concerned. The strength and chemical tests seem to favor slightly the two stage bleach.

The above table also offers a comparison between a typical cook made in this study and a commercial pulp. The color of the two pulps is practically the same, while the chemical constants of the No. 10 pulp are fully as good as for the commercial pulp, with the exception of the Cross and Bevan cellulose, which is a little lower. On the other hand, the viscosity of No. 10 is somewhat higher. From the standpoint of the above tests, it can be said that the No. 10 pulp compares favorably with the commercial pulp.

TABLE XII
COMPARISON OF RESULTS OBTAINED BY SINGLE STAGE HYPOCHLORITE BLEACHING WITH THOSE OBTAINED BY TWO STAGE CHLORINE-HYPOCHLORITE BLEACHING

Cook No. (See Code below)	10-1	10-2	1C-1	1C-2	1C-M
Bleaching Data:					
Per cent bleach consumed as hypochlorite:					
First stage—Chlorine gas	....	13.9	....	3.3	....
Second stage—Bleach liquor	43.9	13.9	8.5	4.1	....
Total	43.9	27.8	8.5	7.4	....
Per cent yield bleached pulp based on unbleached	94.4	92.7	97.0	98.0	....
Color Data:					
Hess-Ives colors:					
Blue	74	75	75	74	74
Green	81	81	80	80	81
Red	83	83	84	83	84
Strength Data:					
Mullen at 15 minutes	34	23	18	26	21
Maximum Mullen	104	108	58	68	61
Time of maximum Mullen in minutes	75	75	60	60	60
Freeness at maximum Mullen	230	300	550	430	490
Chemical Test Data:					
Lignin	1.63	1.88	1.41	1.21	0.89
Cross and Bevan cellulose	95.9	96.7	98.4	98.4	98.6
Alpha-cellulose	82.3	83.7	80.9	82.9	81.2
1 per cent NaOH solubility	8.8	8.4	6.2	5.3	6.5
Copper number	2.18	2.16	1.58	1.29	2.26
Cuprammonium viscosity	13.9	14.2	9.1	9.9	9.7
Pentosan	18.6	....	17.7	17.9	17.6

Code to Cook No.—10-1 = Single Stage Hypochlorite Bleach.
10-2 = Two Stage Chlorination-Hypochlorite Bleach.
1C-1 = Commercial Single Stage Hypochlorite Bleach.
1C-2 = Commercial Two Stage Chlorination-Hypochlorite Bleach.
1C-M = Commercial Mill Bleach

X. Efficiency of the Combined Cooking and Bleaching in Terms of the Various Constituents of the Wood.

It has been shown that the use of dilute liquors and chlorination first stage bleaching in the treatment of aspen wood will give a high yield of pulp of a good strength and color. Since these pulps are of about the same chemical purity as those made by more drastic methods of cooking, the loss of cellulosic material must have been much less.

An attempt has been made in this study to determine relative losses of the various constituents of the wood by the less drastic methods of cooking. One constituent of some significance is alpha-cellulose. It is very difficult to obtain a reliable figure for this constituent, since the value secured by running an alpha-cellulose determination on the Cross and Bevan cellulose may not always represent the true figure for the alpha-cellulose originally present in the wood, due to some possible degrading action of the chlorine gas used in the method of isolation.

In this investigation, a value was obtained representing fairly closely the amount of alpha-cellulose originally present in the wood by the following procedure. The sample for analysis was ground in a flour mill, the portion passing a 60-mesh screen but retained on the 80-mesh being taken for analysis. This was first extracted with alcohol-benzene mixture and then with hot 1 per cent sodium hydroxide solution, after which the alpha-cellulose value of the oven-dried residue was determined in the usual manner. The lignin in the residue was then measured by the method used throughout this study. The value obtained by subtracting the amount of lignin from the residue after the alpha-cellulose determination was taken as the amount of alpha-cellulose present in the wood.

The results of these determinations on aspen wood are given in Table XIII:

TABLE XIII

DETERMINATION OF ALPHA-CELLULOSE IN WOOD

Determination	Per Cent Residue	
	On Wood	On Preceding Residue
Alcohol-Benzene	96.9	96.9
1 per cent NaOH	78.6	81.1
17.5 per cent NaOH	67.9	86.5
Lignin	14.4	21.3
Alpha-cellulose in Wood 53.5		

In Table XIV, the percentage of alpha-cellulose, Cross and Bevan cellulose, and pentosan in the pulp are calculated back to the basis of the original wood. This was done by multiplying the per cent yield of bleached pulp by the per cent of each of the above constituents obtained in the bleached pulp by analysis. This amount was then subtracted from the amount originally present in the wood, and the result tabulated as the amount of that constituent lost, based on the original wood.

In general, it can be said that the method of cooking with dilute liquors followed by chlorination bleaching retains the alpha-cellulose and the Cross and Bevan cellulose originally present in the wood to a greater degree than the present commercial method. The retention of the alpha-cellulose is more marked than that of the Cross and Bevan cellulose, although the loss in either case follows about the same general tendency. The loss of pentosan is fairly constant over the entire series, showing that this material is made up of two portions, one of which is easily removed by alkaline liquors.

XI. Comparison of the Strength Properties of the Pulps.

The strength tests on the pulps obtained in the preceding cooks have been tabulated and are included in the appendix.

In general, the strength of the pulps obtained by cooking with dilute liquors followed by chlorination bleaching is from 50 to 100 per cent higher than that of the pulps produced by the regular commercial process. In addition to the increase in strength, the pulps have the property of becoming hydrated and forming a glassine sheet under conditions of maximum beating. None of the commercial pulps had this property, but remained soft and did not hydrate. In some cases, the fiber from the commercial pulps was shortened so by the beating operation that it would pass through the sheet-forming mould while the freeness was still as high as 500. In contrast to this, the pulps made in this study would hydrate slowly and uniformly over the range of beating, forming at the end a semi-transparent sheet.

A few of the typical strength tests obtained in the preceding cooks are shown in Table XV, and are compared with similar tests on commercial pulps.

TABLE XV

COMPARISON OF THE STRENGTH PROPERTIES OF THE PULPS

Sample No.	Mullen at 15 Minutes	Maximum Mullen	Time of Maximum Mullen in Minutes	Freeness at Maximum Mullen
Cook No. 3	25	59	60	450
Cook No. 10	23	108	75	300
Cook No. 14	22	109	90	340
Cook No. 16	32	89	60	320
Cook No. 19	13	67	90	380
Cook No. 23	13	33	30	510
Commercial Pulp No. 1	21	61	60	490
Commercial Pulp No. 2	21	60	90	370
Commercial Pulp No. 3	26	47	45	510
Commercial Pulp No. 4	22	38	45	420
Commercial Pulp No. 5	21	48	60	440
Check Run	25	49	60	410

TABLE XIV.—EFFICIENCY OF THE COMBINED COOKING AND BLEACHING OPERATION IN TERMS OF THE VARIOUS CONSTITUENTS OF THE WOOD

Sample No.	A. Loss of Alpha-Cellulose			B. Loss of Cross and Bevan Cellulose			C. Loss of Pentosan		
	Per Cent Alpha-Cellulose Remaining after Cooking and Bleaching Operation Based on Wood	Per Cent Loss of Alpha-Cellulose		Per Cent C. and B. Cellulose Remaining after Cooking and Bleaching Operation Based on Wood	Per Cent Loss of C. and B. Cellulose		Per Cent Pentosan Remaining after Cooking and Bleaching Operation Based on Wood	Per Cent Loss of Pentosan	
		Based on Wood	Based on Alpha-Cellulose in Original Wood		Based on Wood	Based on C. and B. Cellulose in Original Wood		Based on Wood	Based on Pentosan in Original Wood
Wood Sample	53.5	00.0	00.0	64.2	00.0	00.0	20.4	00.0	00.0
Cook No. 3	40.1	13.4	25.0	47.6	16.6	25.8	8.5	11.9	58.3
Cook No. 4	39.4	14.1	26.4	47.3	16.9	26.4	8.2	12.2	59.8
Cook No. 5	43.8	9.7	18.1	52.5	11.7	18.2	10.2	10.2	50.0
Cook No. 8	46.3	7.2	13.5	54.3	9.9	15.4	11.3	9.1	44.6
Cook No. 10	47.5	6.0	11.2	54.9	9.3	14.5	10.6	9.8	48.0
Cook No. 12	47.3	6.2	11.6	54.8	9.4	14.6	10.6	9.8	48.0
Cook No. 14	47.3	6.2	11.6	54.6	9.6	15.0	11.0	9.4	46.1
Cook No. 17	41.5	12.0	22.4	53.3	10.9	17.0	9.8	10.6	52.0
Cook No. 19	44.0	9.5	17.8	52.5	11.7	18.2	9.4	11.0	53.8
Cook No. 23	30.4	23.1	43.2	41.4	22.8	35.5	6.7	13.7	67.2
Cook No. 24	38.9	14.6	27.3	46.7	17.5	27.3	7.8	12.6	61.7
* Commercial No. 1	36.5	17.0	31.8	44.4	19.8	30.8	7.9	12.5	61.3
Commercial No. 2	33.0	20.5	38.4	43.6	20.6	32.1	8.6	11.8	57.9

* The yield reported by the mills making these pulps was 45 per cent. This figure was used in calculating the above results.

XII. Comparison of the Opacities of the Unbeaten Bleached Pulps.

This hydrating property of the pulps suggested that they might have a lower opacity than commercial pulps. If this were the case, it would be very detrimental to their use in a book paper furnish, since the higher opacity of soda pulps is one of their main advantages. Table XVI shows the opacities of several of the pulps obtained in the preceding cooks as compared with commercial pulps.

TABLE XVI
COMPARISON OF THE OPACITIES OF THE UNBEATEN BLEACHED PULPS

Sample No.	Basis Weight	Contrast Ratio
Cook No. 1	44.0	0.870
Cook No. 2	44.3	0.897
Cook No. 5	44.7	0.890
Cook No. 6	44.3	0.901
Cook No. 7	44.3	0.873
Cook No. 8	44.3	0.864
Cook No. 9	44.7	0.856
Cook No. 10—Single Stage Bleach	44.7	0.853
Cook No. 10—Two Stage Bleach	44.7	0.853
Cook No. 11	44.3	0.850
Cook No. 12	44.7	0.859
Cook No. 13	44.0	0.874
Cook No. 14	44.3	0.859
Cook No. 15	44.0	0.864
Cook No. 16	44.7	0.864
Commercial Pulp No. 1	43.6	0.875
Commercial Pulp No. 2	42.9	0.853
Commercial Pulp No. 3	41.4	0.850
Commercial Pulp No. 4	42.8	0.854

The unbeaten sheets for these tests were made as near as possible to a 40 pound basis weight (24 x 36-480) under the same carefully controlled conditions as were used in the preparation of the strength test sheets. All opacities were measured by the Davis opacimeter.

The above tests indicate that the opacities of the pulps produced in this study were as great or even greater than the opacities of the commercial pulps.

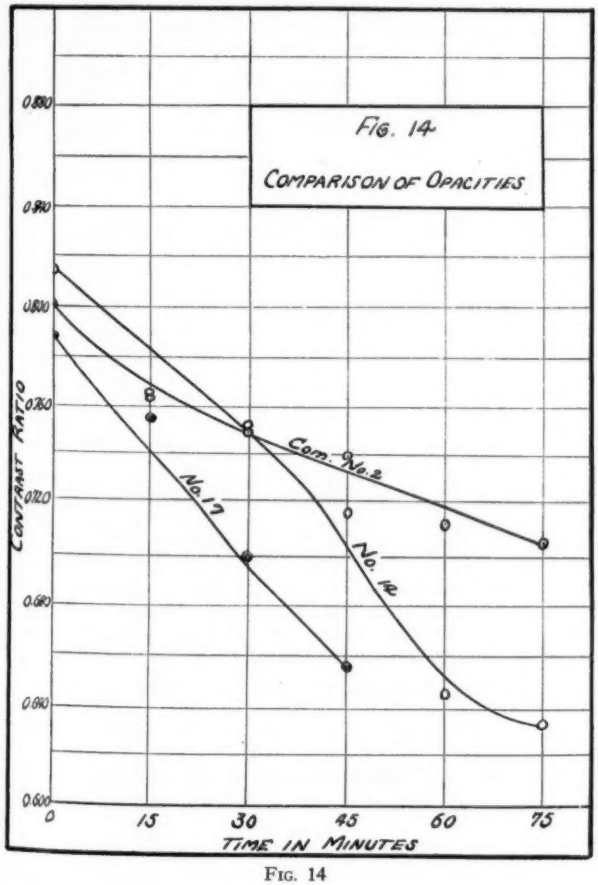

Fig. 14

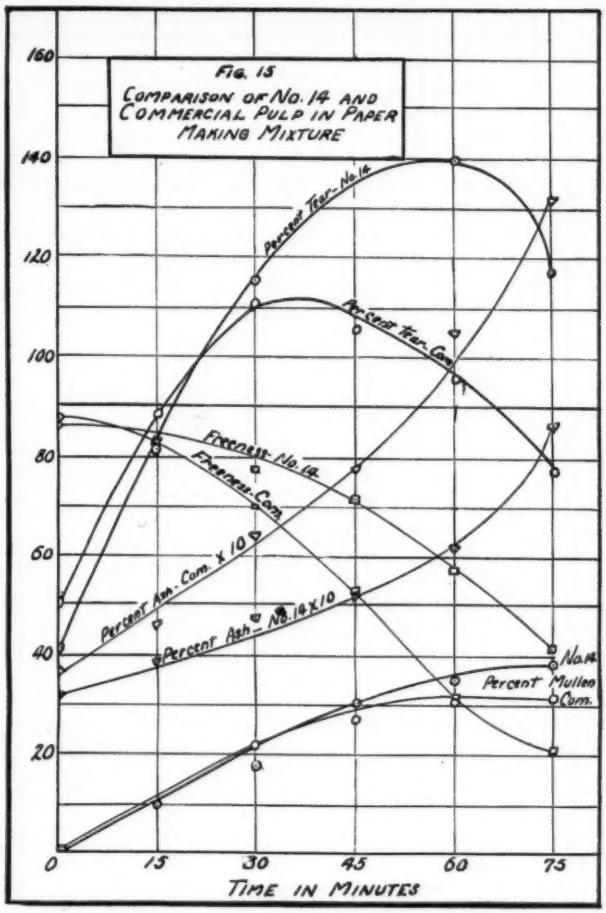

Fig. 15

XIII. Comparison of the Bleached Pulps During the Beating Operation.

Since it was thought that the property of these pulps to hydrate during the beating process might tend to make them poor from an opacity standpoint after a slight beating, a series of sheets was prepared during beater runs and the opacities determined. The results secured were not always consistent, due to the difficulty in producing sheets of exactly the same basis weight.

It was found that the opacity of the pulp made with dilute cooking liquor was superior to the commercial pulp, providing it were not beaten to the maximum degree. In that case, the pulp was hydrated more than the regular soda pulp, and the sheet produced under such conditions was lower in opacity. The results of these tests are shown in Fig. 14 and in Table XVII.

TABLE XVII
COMPARISON OF THE OPACITIES OF THE BLEACHED PULPS DURING THE BEATING OPERATION

Time in Minutes	15	30	45	60	75	90
Basis Weight:						
Cook No. 12	38.4	36.6	37.0	34.4	33.3	33.7
Cook No. 14	35.8	32.2	34.0	31.8	32.2	32.5
Cook No. 17	32.6	30.8	30.4	30.4	...	...
Cook No. 18	38.4	34.8	35.2	35.2	33.3	...
Commercial Pulp No. 1	34.0	34.7	34.0	34.7	...	...
Commercial Pulp No. 2	29.8	30.7	30.0	30.0	29.8	27.8
Contrast Ratio:						
Cook No. 12	0.811	0.782	0.757	0.717	0.647	0.634
Cook No. 14	.814	.765	.754	.717	.690	.664
Cook No. 17	.787	.757	.701	.655	...	...
Cook No. 18	.827	.786	.752	.748	.693	...
Commercial Pulp No. 1	.814	.813	.760	.771	...	...
Commercial Pulp No. 2	.764	.749	.740	.712	.709	.675

XIV. Paper Making Qualities of the Pulps Produced in this Study as Compared with Commercial Pulps in a Book Paper Furnish.

The fact that these pulps had such a high strength and a tendency to become hydrated suggested that a much stronger book sheet with a higher clay-carrying capacity might be made. This was checked by making beater runs on a mixture of soda, sulphite, and clay, the runs being carried out under the following conditions:

200 grams West Coast Sulphite
200 grams No. 3 Commercial Soda
180 grams China Clay
8 grams Rosin as Rosin Size
12 grams Alum
20.6 liters Water

A second run was then made, using the same furnish as above, except that No. 14 bleached soda was used in place of the commercial bleached soda pulp. The mixture was beaten in the one and one-half pound Valley beater, using 15 pounds of weights on the bedplate, or 11 pounds plus 4 pounds for balance. Samples for freeness, tear, and Mullen were taken every 15 minutes. The conditions for sheet formation, pressing, and drying were the same as those used for the regular strength tests.

It was found that the pulp made in this study gave higher bursting and tearing strength curves when mixed and beaten with sulphite pulp than did the commercial soda pulp under the same conditions. The mixture of sulphite and commercial soda pulp showed a greater tendency toward rapid hydration, and for this reason held a greater percentage of ash. If the two are compared at the same freeness, however, they are very much alike. The opacities of the commercial mixture are somewhat higher, but this is probably due to the difference in ash content. In general, it can be said that a pulp of the nature of No. 14 could be used advantageously in a book furnish of this kind.

The results of these runs are given in Table XVIII and in Fig. 15.

TABLE XVIII

COMPARISON OF PAPER MAKING QUALITIES OF NO. 14 AND COMMERCIAL PULPS IN A MIXTURE WITH SULPHITE PULP AND CLAY

Time in Minutes.....	0	15	30	45	60	75
Per Cent Mullen:						
No. 14 Mixture.....	..	10	18	31	34	40
Commercial Mixture..	..	10	22	28	31	32
Per Cent Tear:						
No. 14 Mixture.....	41	81	116	131	140	117
Commercial Mixture..	50	89	111	106	96	78
Basis Weight:						
No. 14 Mixture.....	46.5	39.8	40.6	38.8	37.0	41.7
Commercial Mixture..	38.8	38.4	39.6	38.4	37.0	37.4
Freeness:						
No. 14 Mixture.....	860	830	780	710	580	420
Commercial Mixture..	880	830	700	540	320	210
Contrast Ratio:						
No. 14 Mixture.....	0.848	0.806	0.822	0.790	0.795	0.828
Commercial Mixture..	.814	.814	.806	.806	.830	.830
Per Cent Ash:						
No. 14 Mixture.....	3.2	3.9	4.8	5.3	6.2	8.7
Commercial Mixture..	3.7	4.7	6.4	7.8	10.6	13.3

The Economics of the Regular Soda Pulping Process Versus the New Process Using Dilute Soda Cooking Liquors and a Two Stage Chlorine-Hypochlorite Bleach

Comparing the quality of the pulp produced by Cook No. 17, made by this special process, with that of Cook No. 23, made by the normal soda cooking process, we find that the strength, color, and chemical composition of pulp No. 17 are at least the equal of pulp No. 23. The pulping conditions for these cooks were as follows:

	Cook 17	Cook 23
Pounds NaOH per 100 pounds of bone-dry wood.....	16.0	25.0
Per cent alkali consumed on amount added.....	85.7	78.9
Concentration of cooking liquor in grams per liter.....	35.0	100.0
Total time of cook in hours.....	5¼	5¼
Time at maximum pressure in hours.....	4¼	4¼
Maximum pressure in pounds per square inch.....	100	115
Per cent yield of oven-dry screened pulp on wood.....	54.2	42.8
Per cent bleach required containing 35 per cent chlorine...	33.6	12.5

A brief comparison of the essential cooking data per ton of pulp made may be of interest:

1. Yield of Pulp
   Cook No. 17—54.2 per cent
   Cook No. 23—42.8 per cent
   Increase in pulp yield—26.7 per cent
   Saving in wood— 21.1 per cent
2. Liquor Recovery
   Cook No. 17—2,020 gallons per ton of pulp
   Cook No. 23—1,400 gallons per ton of pulp
   Cook No. 17 is made at a concentration of 35 grams per liter, using strong white liquor of 100 grams per liter which has been diluted with black liquor. Disregarding the liquors which were obtained from washing the pulp and considering only the black liquor from the digester, the liquor sent to the recovery will be as follows:
   Cook No. 17— 708 gallons per ton of pulp
   Cook No. 23—1,400 gallons per ton of pulp
   This should result in a decided saving in the recovery operation.
3. Chemical Saving
   Cook No. 17— 590 pounds NaOH per ton of pulp
   Cook No. 23—1,170 pounds NaOH per ton of pulp
   A saving of 49.5 per cent of caustic soda is thus obtained, on which recovery labor and lime for causticization are saved. Assuming a 90 per cent recovery of caustic soda and not taking into consideration the fact that some of the new process black liquor is used for dilution, the recovery loss per ton of pulp would be as follows:
   Cook No. 17— 59 pounds NaOH lost per ton of pulp
   Cook No. 23—117 pounds NaOH lost per ton of pulp
4. Bleach Cost Per Ton of Pulp
   Cook No. 17—672 pounds bleach (35 per cent chlorine)
   Cook No. 23—250 pounds bleach (35 per cent chlorine)
5. Steam Cost Per Ton of Pulp
   Cook No. 17—2,020 gallons per ton of pulp raised to 100 pounds pressure
   Cook No. 23—1,400 gallons per ton of pulp raised to 115 pounds pressure

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A. C. S. Cellulose Division to Meet

The Cellulose Division of the American Chemical Society will meet in Chicago on September 10-15, 1933. The following papers will be presented.

Symposium on the "Synthesis and Structure of the Cell Wall of Wood and the Constitution and Industrial Application of Lignin."

1. A Physiological Aspect of Lignification, by O. L. Sponsler.
2. Rate of Carbohydrate Condensation on the Cell Wall, by O. L. Sponsler.
3. Structure of the Cell Wall of Wood Fibers, by G. J. Ritter.
4. Rate of Formation of the Crystalline Structure of Wood Fibers, by G. J. Ritter and C. W. Stillwell.
5. Structure of Wood Lignin Prepared by Chemical Procedures, by F. Brauns and H. Hibbert.
6. Crystalline Orientation in the Cell Walls of Cellulose Fibers, by W. A. Sisson.
7. An X-Ray Examination of Some of the Fragments of the Cellulose Molecule, by G. J. Leuck and H. Mark.
8. Some Chemical Reactions of Maple and Spruce Lignin, by L. F. Hawley.
9. Utilization of Sulphite Liquor, by G. Howard.
10. Wood that Improves on Natures Best, by R. M. Boehme.
11. The Anaerobic Fermentation of Lignin, by C. S. Boruff and A. M. Buswell.

IMPORTS OF PAPER AND PAPER STOCK

NEW YORK, BOSTON, PHILADELPHIA AND OTHER PORTS

NEW YORK IMPORTS

WEEK ENDING AUGUST 19, 1933

CIGARETTE PAPER

American Tobacco Co., Ile de France, Havre, 100 cs.; Champagne Paper Corp., Ile de France, Havre, 741 cs.; American Tobacco Co., Pr. Roosevelt, Havre, 300 cs.

PAPER HANGINGS

W. H. S. Lloyd & Co., Amer. Banker, London, 4 bls.

NEWS PRINT

Jay Madden Corp., Scanyork, Kotka, 67 rolls; Lunham & Reeve, Scanyork, Kotka, 160 rolls; Jay Madden Corp., Berlin, Bremen, 262 rolls; Perkins Goodwin & Co., Berlin, Bremen, 345 rolls; W. H. Bell, Markland, Liverpool, N. S., 2679 rolls; News Syndicate Co. Inc., Belvoir, Thorold, 2847 rolls; Mercur Corp., Donnacona 2, Montreal, 580 rolls.

PRINTING PAPER

Jay Madden Corp., Scanyork, Wiborg, 66 rolls, 49 bls.; International F'd'g Co., Black Falcon, Antwerp, 9 cs.; E. Dietzgen & Co., Statendam, Rotterdam, 19 cs.; Ozalid Corp., Statendam, Rotterdam, 6 cs.; International F'd'g Co., Statendam, Rotterdam, 4 cs.; C. Steiner, Pr. Roosevelt, Hamburg, 30 cs.

WRAPPING PAPER

F. C. Strype, Minnetonka, Antwerp, 10 cs.; Walker Goulard Plehn Co., Pr. Roosevelt, Hamburg, 1498 pkgs.; Van Oppen & Co., Pr. Harrison, Genoa, 30 cs.; C. Steiner, Hamburg, Hamburg, 5 cs.

PACKING PAPER

C. Steiner, Beemsterdyk, Rotterdam, 119 bls.

FILTER PAPER

H. Reeve Angel & Co. Inc., Amer. Banker, London, 12 cs.

FILTER MASS

——, Scanyork, Stettin, 30 bls.

SURFACE COATED PAPER

Gevaert Co. of America, Minnetonka, Antwerp, 32 cs.; P. C. Zuhlke, Minnetonka, Antwerp, 1 cs.; Globe Shipping Co., Berlin, Bremen, 8 cs.

METAL COATED PAPER

K. Pauli Co., Berlin, Bremen, 16 cs.; Globe Shipping Co., Columbus, Bremen, 18 cs.

COATED PAPER

Chas. Happel, Pr. Roosevelt, Hamburg, 8 cs.; Freedman & Slater, Hamburg, Hamburg, 3 cs.

BASIC PAPER

F. C. Strype, Berlin, Bremen, 63 cs.; F. C. Strype, Columbus, Bremen, 33 cs.

DECALCOMANIAS

L. A. Consmiller, Bremen, Bremen, 3 cs.; Sellers Transportation Co., Bremen, Bremen, 9 cs.; Sellers Transportation Co., Columbus, Bremen, 9 cs.; Phoenix Shipping Co., Columbus, Bremen, 3 cs.

DECALCOMANIA PAPER

B. F. Drakenfeld & Co., Scythia, Liverpool, 10 cs. (duplex), 19 cs. (simplex).

TRANSFER PAPER

Atlantic Freighting Co. Inc., Hamburg, Hamburg, 12 cs.; Manhattan Decalcomania Co., Columbus, Bremen, 1 cs.

TISSUE PAPER

Jay Madden Corp., Scanyork, Helsingfors, 11 cs, 12 bbls.; Van Oppen & Co., Pr. Harrison, Marseilles, 8 cs.

MISCELLANEOUS PAPER

Steiner Paper Corp., Statendam, Rotterdam, 16 cs.; Japan Paper Co., Ile de France, Havre, 6 cs.; Keller Dorian Paper Co., Ile de France, Havre, 6 cs., 1 ble.; C. Schleicher & Schull Co., Hamburg, Hamburg, 1 ble., 15 cs.

RAGS, BAGGINGS, ETC.

F. Stern, Black Falcon, Antwerp, 122 bls. rags; H. Schimmel, Black Falcon, Antwerp, 46 bls. cotton waste; Van Oppen & Co., Black Falcon, Antwerp, 19 bls. bagging, 78 bls. rags; Royal Manfg. Co., Black Falcon, Antwerp, 108 bls. cotton waste, J. Cohen Son & Co., Inc., Amer. Banker, London, 89 bls. paper stock; Bank of N. Y. Trust Co., Amer. Banker, London, 34 bls. paper stock; Bank of N. Y. Trust Co., Invella, B. Ayres, 145 bls. rags; Johns Manville Co., Alberta, Venice, 252 bls. rags; Darmstadt Scott & Courtney, Alberta, Venice, 59 bls. rags; Banco Coml Italiane Trust Co., Alberta, Venice, 44 bls. rags; W. Steck & Co., Alberta, Trieste, 295 bls. rags; J. Cohen Son & Co., Inc., Scythia, Liverpool, 15 bls. rags; ——, Scythia, Liverpool, 39 bls. rags; E. J. Keller Co., Inc., Pan America, ——, 24 bls. rags; Trust Co. of North America, Ingria, Valencia, 215 bls. dark cottons; S. Birkenstein & Sons, Ingria, Barcelona, 44 bls. dark cottons; Chemical Bank Trust Co., Ingria, Barcelona, 502 bls. rags; Keene & Arkus, Ingria, Barcelona, 180 bls. rags; Chase National Bank, Ingria, Barcelona, 45 bls. rags; ——, Ingria, Barcelona, 103 bls. bagging; Bank of N. Y. Trust Co., Ingria, Barcelona, 82 bls. tares, 70 bls. cottons; ——, Examelia, Barcelona, 278 bls. bagging; Van Oppen & Co., McKeesport, Havre, 200 bls. bagging, E. J. Keller Co., Inc., McKeesport, ——, 90 bls. new cuttings; A. M. Schmid & Co., Hamburg, Hamburg, 35 bls. rags; J. Cohen Son & Co., Inc., Tuscania, Glasgow, 3 bls. rags; ——, Tuscania, Glasgow, 41 bls. paper stock; E. J. Keller Co., Inc., Statendam, ——, 103 bls. bagging.

GLUE STOCK, ETC.

——, Hamburg, Hamburg, 126 bags hide glue; ——, Hamburg, Hamburg, 60 bags bone glue; ——, Columbus, Bremen, 300 bags hide glue.

OLD ROPE

Banco Coml Italiane Trust Co., Berlin, Bremen, 77 coils; W. Steck & Co., Statendam, Rotterdam, 281 coils; ——, American Banker, London, 40 coils; E. J. Keller Co., Inc., American Banker, ——, 82 coils; ——, Ingria, Barcelona, 75 coils; Banco Coml Italiane Trust Co., Pr. Roosevelt, Hamburg, 47 coils.

CASEIN

Tupman Thurlow & Co., Inc., Invella, B. Ayres, 300 bags; ——, Ile de France, Havre, 668 bags; Chase National Bank, Pan America, B. Ayres, 250 bags; Tupman Thurlow & Co., Inc., Pan America, B. Ayres, 417 bags; Casein Manfg Co., Pan America, B. Ayres, 2592 bags; D. C. Andrews & Co., Hamburg, Hamburg, 70 bags.

WOOD PULP

E. J. Keller Co. Inc., Scanyork, ——, 339 bls. wood pulp, 52 tons; Lagerloef Trading Co., Scanyork, Kotka, 275 bls. sulphate, 55 tons, 305 bls. sulphite, 55 tons; Lagerloef Trading Co., Scanyork, Wiborg, 170 bls. sulphite, 28 tons, 2309 bls. sulphate, 446 tons; Castle & Overton, Inc., Scanyork, Wiborg, 1698 bls. wood pulp, 334 tons; Lagerloef Trading Co., Scanyork, Helsingfors, 102 bls. mechanical, 20 tons, 274 bls. sulphite, 45 tons; Irving Trust Co., Berlin, Bremen, 300 bls. wood pulp; Castle & Overton, Inc., Statendam, Rotterdam, 630 bls. wood pulp; A. Giese & Son, Statendam, Rotterdam, 130 bls. wood pulp; Castle & Overton, Inc., Hamburg, Hamburg, 710 bls. wood pulp, 142 tons; M. Sone, Hamburg, Hamburg, 375 bls. wood pulp, 75 tons; Stora Kopparberg Corp., Oxelosund, Skutskar, 500 bls. wood pulp; Price & Pierce, Ltd., Oxelosund, Wallvik, 600 bls. sulphite, 250 bls. mechanical; ——, Oxelosund, Hernosand, 300 bls. sulphite; ——, Oxelosund, Hernosand, 960 bls. sulphate; Pagel Horton & Co., Inc., Oxelosund, Ornskoldsvik, 1528 bls. chemical pulp; Johaneson Wales & Sparre Inc., Oxelosund, Gothenburg, 252 bls. sulphate; Gottesman & Co., Inc., Oxelosund, Gothenburg, 600 bls. sulphate.

WOOD PULP BOARDS

Lagerloef Trading Co., Scanyork, Kotka, 100 bls., 15 tons, 97 rolls, 20 tons; Johaneson Wales & Sparre, Inc., France Maru, Hamburg, 491 rolls, 106 tons.

ALBANY IMPORTS

WEEK ENDING AUGUST 19, 1933

Halifax Power & Pulp Co., Severoles, Sheet Harbor, 8095 bls. wood pulp; Amtorg Trading Corp., N. Maersk, Archangel, 3918 cords pulp wood; Perkins Goodwin & Co., France Maru, Hamburg, 5101 bls. wood pulp, 797 tons.

BOSTON IMPORTS

WEEK ENDING AUGUST 19, 1933

Atkinson Haersick & Co., Pr. Harrison, Genoa, 14 cs. wrapping paper; Brown Bros. Harriman & Co., Scythia, Liverpool, 24 bls. card waste; F. S. Webster Inc., Scythia, Liverpool, 10 cs. tissue paper; G. F. Malcolm Inc., Scythia, Liverpool, 34 cs. tissue paper; Castle & Overton, Inc., Beemsterdyk, Rotterdam, 1700 bls. wood pulp; Stora Kopparberg Corp., Oxelosund, Skutskar, 3250 bls. wood pulp; Bulkley Dunton & Co., Oxelosund, ——, 750 bls. wood pulp; Price & Pierce, Ltd., Oxelosund, Wallvik, 1650 bls. sulphite, 600 bls. sulphate, 125 bls. mechanical; ——, Oxelosund, Hernosand, 660 bls. sulphite; ——, Oxelosund, Hernosand, 480 bls. sulphate; Brown Bros. Harriman & Co., Oxelosund, Hernosand, 2160 bls. sulphate; Pagel Horton & Co., Inc., Oxelosund, Ornskoldsvik, 611 bls. sulphite; Tradesmans Natl Bank, Oxelosund, Norrsundet, 3625 bls. sulphate; Perkins Goodwin & Co., Oxelosund, Norrsundet, 1000 bls. sulphate; Central Hanover Bank Trust Co., Oxelosund, Gothenburg, 5080 bls. sulphate.

PHILADELPHIA IMPORTS

WEEK ENDING AUGUST 19, 1933

J. W. Hampton Jr. Co., Scanyork Kotka, 64 rolls newsprint; Lagerloef Trading Co., Scanyork Kotka, 666 bls. sulphite, 133 tons; Lagerloef Trading Co., Scanyork Kotka, 260 bls. sulphate, 52 tons; Lagerloef Trading Co., Scanyork Kotka, 473 bls. woodpulp boards, 52 tons; Lagerloef Trading Co., Scanyork Wiburg, 7234 bls. sulphite, 1446 tons; Castle & Overton, Inc., Scanyork Wiburg, 1053 bls. wood pulp, 209 tons; Jay Madden Corp., Scanyork Helsingfors, 16 bbls. tissue paper; Lagerloef Trading Co., Scanyork Helsingfors, 508 bls. mechanical, 101 tons; Lagerloef Trading Co., Scanyork Helsingfors, 795 bls. sulphite, 132 tons; W. H. Bell, Markland Liverpool, N. S., 3928 rolls news print; W. H. Bell, Alberta Venice, 2161 bls. rags; State Chemical Co., Beemsterdyk Rotterdam, 400 bags wood flour; Castle & Overton, Inc., Beemsterdyk Rotterdam, 91 bls. rags; ———, Beemsterdyk Rotterdam, 90 bls. rags; Chemical Bank Trust Co., Ingria Barcelona, 128 bls. rags; Bank of N. Y. Trust Co., Ingria Barcelona, 30 bls. rags.

NORFOLK IMPORTS

WEEK ENDING AUGUST 19, 1933

R. J. Reynolds Tobacco Co., Beemsterdyk Rotterdam, 856 cs. cigarette paper; Chase National Bank, McKeesport Havre, 165 bls. bagging; N. Y. Trust Co., McKeesport Havre, 83 bls. bagging.

BALTIMORE IMPORTS

WEEK ENDING AUGUST 19, 1933

Castle & Overton, Inc., Beemsterdyk Rotterdam, 580 bls. wood pulp; National City Bank, Beemsterdyk Rotterdam, 690 bls. rags; National City Bank, Beemsterdyk Rotterdam, 564 bls. bagging; ———, McKeesport Havre, 39 bls. rags; Keene & Arkus, McKeesport Havre, 143 bls. rags; Congoleum Nairn Co., McKeesport Havre, 372 bls. rags; E. J. Keller Co. Inc., McKeesport ———, 206 bls. rags; Congoleum Nairn Co., McKeesport Dunkirk, 285 bls. rags; Keene & Arkus, McKeesport Dunkirk, 159 bls. rags; ———, Oxelosund Ornskoldsvik, 4590 bls. chemical pulp; ———, Oxelosund Ornskoldsvik, 306 bls. sulphite; Parsons & Whittemore, Inc., Oxelosund Gothenburg, 150 bls. chemical pulp; Perkins Goodwin & Co., Oxelosund Gothenburg, 1524 bls. sulphite; E. M. Sergeant & Co., Oxelosund Gothenburg, 299 bls. kraft soda; E. J. Keller Co., Inc., City of Norfolk ———, 136 bls. wood pulp.

NEW ORLEANS IMPORTS

WEEK ENDING AUGUST 19, 1933

E. J. Keller Co. Inc., Cody ———, 502 bls. old rags.

Work of the Import Committee

Attention of the Customs Officials has been called by the Import Committee of the American Paper Industry to the probable violation of the Anti-Dumping Act in the importation of orange colored news print for an automobile tire manufacturer, and of white news print for a motor gasoline manufacturer. In both cases foreign paper is being sold for these special uses at about $8 per ton below the lowest prevailing prices for similar papers.

New York Market Review

Office of the PAPER TRADE JOURNAL.
Wednesday, August 23, 1933

Sentiment in the local paper market continues optimistic. Demand for the various standard grades of paper is excellent for the time of year. Sales forces of the leading paper organizations are quite busy. Prices are holding to recently advanced levels and reports of shading are infrequent.

The news print paper market is more stable than for some time past. Production in the United States and Canada is being maintained in increased volume to take care of current requirements. Stocks at the mills are not excessive. Although quotations remain unchanged the outlook is encouraging.

Steadiness prevails in the paper board market. With prices of raw materials soaring, box board quotations are decidedly firm. The fine paper market is displaying a strong undertone. Tissues are moving in good volume. The coarse paper market is sharing the improvement.

Mechanical Pulp

The ground wood pulp market is in a sound position. Demand for both domestic and imported mechanical pulp is satisfactory. The contract movement is normal. No. 1 imported moist ground wood pulp is quoted at from $24 to $28 per ton, on dock, Atlantic ports; and dry mechanical pulp at from $26 to $28 per ton.

Chemical Pulp

Conditions in the chemical pulp market are practically unchanged. Both imported and domestic grades are in persistent request. Imported bleached sulphite is still quoted at from $2.70 to $3.00, on dock, Atlantic ports; while domestic and Canadian bleached sulphite is offered at from $2.50 to $3.00, f.o.b. pulp mill.

Old Rope and Bagging

The old rope market is only moderately active. Offerings of domestic and imported old manila rope are limited, however, and quotations firm. Small mixed rope is rather quiet. The bagging market is marking time. Gunny and scrap bagging are moving in fairly heavy volume. Roofing bagging is dull.

Rags

Trading in the domestic rag market has quieted down somewhat. Demand for new cotton rags has fallen off slightly, but offerings are scarce and prices continue firm. No. 1 white shirt cuttings are holding up well. Roofing grades are fairly steady. No radical changes have transpired in the imported rag market.

Waste Paper

The paper stock market continues firm. Board mill demand for the lower grades of waste paper is well sustained. No. 1 mixed paper and strictly folded news continue strong, with offerings limited. The higher grades of paper stock are holding up well, especially hard and soft white shavings, and hard white envelope cutting.

Twine

While the local twine market is only fairly active at present, the statistical position of the industry is highly satisfactory for the season, and more lively trading is anticipated during the closing months of the year. Prices are generally firm and recent advances are well maintained.

Regulator Companies Change Name

The Mason Regulator Company, of Boston, manufacturers of automatic regulating and control equipment, and the Neilan Company, Ltd., of Los Angeles (subsidiary of the Mason Company) have consolidated. The name of the new company is the Mason-Neilan Regulator Company.

The engineering, manufacturing and sales departments of the two individual companies have been combined at 1190 Adams street, Boston, Mass. F. Kenneth Morrison, former sales manager of the Mason Regulator Company will continue in this same position for the consolidated company. Douglas H. Annin, chief engineer of the Neilan Company for several years will serve in a similar capacity in the new Mason-Neilan Regulator Company.

This union brings under the Mason-Neilan trade mark a complete line of automatic pressure regulating valves, liquid level controllers, as well as compensated instruments for controlling pressures, temperatures, rates-of-flow and combustion.

NEWSPAPER HEARING IN SEPTEMBER

(Continued from Page 11)

The revised General Code for the Pulp and Paper Industry, and the codes for the Writing Paper Manufacturers Association and the Cover Paper Manufacturers Association are printed on pages 17, 21 and 22 of this issue. The new General Paper Code, filed as of August 15, is briefer than the original code and the clause restricting the installation of new machinery has been entirely eliminated.

The Kraft Manufacturers were scheduled to meet in New York today, Thursday, August 24, to complete the drafting of their codes.

German Paper Production Rises

German paper production during the current year continues to show a slight increase over last year's output, according to reports to the Department of Commerce. The total production for the five months ending May 31 was 684,795 metric tons as against 655,375 tons during the corresponding period of 1932.

Miscellaneous Markets

Office of the PAPER TRADE JOURNAL,
Wednesday, August 23, 1933.

BLANC FIXE.—The position of the blanc fixe market is practically unchanged. Prices are generally holding to schedule. The pulp is quoted at from $42.50 to $45.00 per ton, in bulk; while the powder is selling at from 3 to 3½ cents per pound, in barrels, at works.

BLEACHING POWDER.—Steadiness prevails in the bleaching powder market. Demand is fairly good for the season. Contract shipments are moving regularly. Prices remain unchanged. Bleaching powder is quoted at from $1.75 to $2.00 per 100 pounds, in drums, at works.

CASEIN.—The casein market is firmer. Domestic standard ground is quoted at 14¾ and finely ground at 15½ cents per pound. Argentine standard ground is selling at 14 and finely ground at 15 cents per pound, all in bags, car lot quantities.

CAUSTIC SODA.—Demand for caustic soda continues persistent. The contract movement is well up to average. Solid caustic soda is quoted at from $2.55 to $3.00; while the flake and the ground are selling at from $2.95 to $3.00 per 100 pounds, in large drums, at works.

CHINA CLAY.—The china clay market is moderately active. Prices are generally holding to previously quoted levels. Imported china clay is quoted at from $12 to $17 per ton, ship side; while domestic paper making clay is selling at from $4.50 to $12.00 per ton, at mine.

CHLORINE.—Conditions in the chlorine market are satisfactory. Demand from the paper mills is seasonally active. Prices are holding up well, in most instances. Chlorine is quoted at $1.75 per 100 pounds, in tanks, or multi-unit cars, in ton lots, or over, at works.

ROSIN.—The rosin market is slightly easier. The grades of gum rosin used in the paper mills are quoted at from $4.90 to $4.95 per 280 pounds, in barrels, at works; while wood rosin is selling at $3.80 per 280 pounds, in barrels, at southern shipping points.

SALT CAKE.—Business in the salt cake market is buoyant. Prices are steady to firm. Salt cake is quoted at from $14 to $14.50; chrome salt cake at from $13.50 to $14 per ton, at works; while imported salt cake is selling at from $14 to $14.50 per ton, on dock.

SODA ASH.—The soda ash market is displaying a strong undertone. Demand from the paper mills is well sustained. Prices are firm. Quotations on soda ash, in car lots, at works, per 100 pounds, are as follows: in bulk, $1.05; in bags, $1.30; and in barrels, $1.43.

STARCH.—Trading in the starch market is rather quiet. The contract movement is seasonal. Prices are holding to formerly quoted levels. Special paper making starch is selling at $2.84 per 100 pounds, in bags; and at $3.11 per 100 pounds, in barrels, at works.

SULPHATE OF ALUMINA.—Paper mill demand for sulphate of alumina is fairly persistent. Prices remain unchanged. Commercial grades are quoted at from $1.25 to $1.46; while iron free is selling at from $1.90 to $2.05 per 100 pounds, in barrels, at works.

SULPHUR.—The sulphur market continues firm. Sulphur is quoted at $18 per long ton, on orders of 1,000 tons, or over, on yearly contracts; and at $20 per ton on any smaller quantity over that period. On spot and nearby car loads, the quotation is $21 per ton.

TALC.—While trading is rather quiet, the talc market is in a strong position. Prices are holding to schedule. Domestic talc is quoted at from $16 to $18 per ton, in bulk, at eastern mines; while imported talc is selling at from $20 to $50 per ton, ship side.

Market Quotations

Paper

(F. o. b. Mill)

Ledgers	6.50	@	—
Bonds	6.00	@	—
Index	6.00	@	—
Writings			
Extra Superfine	6.50	@	—
Superfine	6.25	@	—
Cud sized	4.50	@	7.00
Engine sized	4.00	@	5.00
Book, Cased—			
S. & S. C.	5.50	@	—
S. & S. C. Litho.	5.75	@	—
M. F.	5.25	@	—
Coated and Enamel	6.15	@	9.30
Coated Litho	6.90	@	—
Tissues—Per Ream—			
White No. 1	.60	@	.80
White No. 2	.55	@	.70
Anti Tarnish M. G. only	.75	@	.80
Colored	.80	@	1.00
Kraft	.75	@	.80
Manila	.65	@	.70
Manila—			
No. 1 Jute	9.00	@	9.25
No. 2 Jute	7.75	@	8.50
No. 1 Wood	4.00	@	5.25
No. 2 Wood	3.50	@	4.00
Butchers	3.37½	@	—
Fibre Papers—			
No. 1 Fibre	4.25	@	5.50
No. 2 Fibre	4.00	@	4.75
Common Bogus	1.50	@	3.00
Screenings	2.00	@	3.00
Card Middles	4.00	@	5.00
Glassine—			
Bleached, basis 25 lbs., No. 1	.11	@	—
No. 2	.10	@	—
Bleached, basis 20 lbs.	.13	@	—

(Delivered New York)

News, per ton—			
Roll, contract	40.00	@	—
Rolls, spot	40.00	@	—
Sheets	45.00	@	—
Side Runs	25.00	@	—
Kraft—			
No. 1 Domestic	4.75	@	5.00
No. 2 Domestic	3.62½	@	4.00
Southern	3.62½	@	4.00
Imported	Nominal		
Boards—per ton—			
News	45.00	@	50.00
Chip	42.50	@	47.50
Binders Boards	68.00	@	72.00
Kraft Liner	75.00	@	85.00
Standard 85 Test Jute Liner	50.00	@	55.00
Sgl. Mla. Ll. Chip	52.50	@	55.00

(F. o. b. Mill)

Wood Pulp Board	70.00	@	80.00

Mechanical Pulp

(On Dock, Atlantic Ports)

No. 1 Imported—			
Moist	24.00	@	28.00
Dry	26.00	@	28.00

(F.o.b. Mill)

No. 1 Domestic and Canadian	24.00	@	28.00

Chemical Pulp

(On Dock, Atlantic Ports)

Sulphite (Imported)—			
Bleached	2.70	@	3.00
Easy Bleaching	1.95	@	2.10
No. 1 strong unbleached	1.90	@	2.00
Mitscherlich Unbleached	1.95	@	2.00
No. 2 Strong unbleached	1.75	@	1.85
No. 1 Kraft	1.75	@	1.85
No. 2 Kraft	1.60	@	1.70
Sulphite—			
Bleached	2.75	@	3.25

(F. o. b. Pulp Mill)

Sulphite (Domestic and Canadian)—			
Bleached	2.50	@	3.00
Easy Bleaching	1.80	@	1.90
News	1.70	@	1.80
Mitscherlich unbleached	2.25	@	2.50
Kraft (Domestic)	1.60	@	2.75
Soda Bleached	2.50	@	—

Domestic Rags

New Rags

(Prices to Mill f. o. b. N. Y.)

Shirt Cuttings—			
New White, No. 1.	5.75	@	6.25
Silesias No. 1	4.00	@	4.50
New Unbleached	6.75	@	7.25
New Soft Blacks	3.00	@	3.25
Blue Overall	4.25	@	4.50
Fancy	2.00	@	2.25
Washables	1.75	@	2.00
Mixed Khaki Cuttings	2.50	@	2.75
O. D. Khaki Cuttings	3.13	@	3.38
Men's Corduroy	1.50	@	1.75
New Mixed Blacks	2.50	@	2.75

Old Rags

White, No. 1—			
Repacked	3.75	@	4.00
Miscellaneous	3.00	@	3.50
White, No. 2—			
Repacked	2.00	@	2.50
Miscellaneous	1.75	@	2.00
Thirds and Blues—			
Repacked	1.75	@	2.00
Miscellaneous	1.50	@	1.75
Black Stockings	2.50	@	3.00
Roofing Rags—			
No. 1	.90	@	.95
No. 2	.80	@	.85
No. 3	.75	@	.80
No. 4	.70	@	.75
No. 5A	.65	@	.70

Foreign Rags

New Rags

New Dark Cuttings	1.50	@	1.60
New Mixed Cuttings	1.60	@	1.70
New Light Silesias	3.50	@	3.75
Light Flannelettes	3.25	@	3.50
Unbleached Cuttings	5.50	@	5.75
New White Cuttings	5.00	@	5.50
New Light Oxfords	3.25	@	3.50
New Light Prints	2.75	@	3.00

Old Rags

No. 1 White Linens	6.25	@	6.75
No. 2 White Linens	5.25	@	5.75
No. 3 White Linens	4.25	@	4.00
No. 4 White Linens	2.00	@	2.25
No. 1 White Cotton	3.75	@	4.00
No. 2 White Cotton	3.00	@	3.25
No. 3 White Cotton	2.50	@	2.75
No. 4 White Cotton	1.50	@	1.60
Extra Light Prints	2.00	@	2.25
Ord. Light Prints	1.75	@	1.85
Med. Light Prints	1.55	@	1.65
Dutch Blue Cottons	1.65	@	1.80
French Blue Linens	2.10	@	2.25
German Blue Linens	1.85	@	2.00
German Blue Cottons	1.35	@	1.50
Checks and Blues	1.30	@	1.40
Lindsay Garments	1.10	@	1.15
Dark Cottons	.95	@	1.00
Old Shopperies	.85	@	.90
New Shopperies	.80	@	.85
French Blues	1.50	@	1.65

Old Rope and Bagging

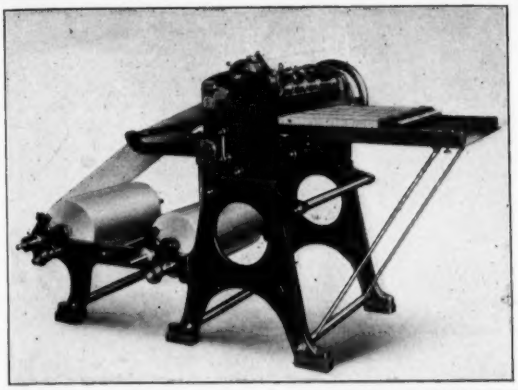
(Prices to Mill f. o. b. N. Y.)

Gunny No. 1—			
Foreign	1.30	@	1.40
Domestic	1.25	@	1.35
Wool Tares, light	1.05	@	1.15
Wool Tares, heavy	1.05	@	1.15
Bright Bagging	1.00	@	1.10
Manila Rope—			
Foreign	2.75	@	3.00
Domestic	2.50	@	2.75
Small Mixed Rope	1.00	@	1.25
New Burlap Cut	1.50	@	1.75
Hessian Jute Threads—			
Foreign	2.60	@	2.75
Domestic	2.80	@	3.00

Old Waste Papers

(F. o. b. New York)

Shavings—			
White Envelope Cuttings	2.65	@	2.85
Ordinary Hard White No. 1	2.40	@	2.50
Hard White No. 2	2.30	@	2.40
Soft White No. 1	2.20	@	2.30
Flat Stock—			
Stitchless	1.05	@	1.15
Overissue Mag.	1.05	@	1.15
Solid Flat Book	.95	@	1.05
Crumpled No. 1	.85	@	.90
Solid Book Ledger	1.50	@	1.75
Ledger Stock	1.05	@	1.15
New B. B. Chips	.65	@	.70
Manilas—			
New Env. Cut	1.60	@	1.70
New Cuttings	1.20	@	1.25
Extra No. 1 old	.90	@	1.00
Print	Nominal		
Bogus Wrapper	.70	@	.80
Container	Nominal		
Old Kraft Machine—			
Compressed bales	1.20	@	1.30
News—			
No. 1 White News	1.20	@	1.30
Strictly Overissue	.75	@	.85
Strictly Folded	.85	@	.90
No. 1 Mixed Paper	.80	@	.85



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Any Size, for all machines

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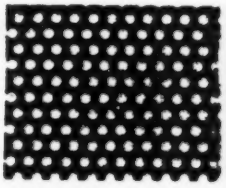
For Pulp and Paper Mills



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5. Positive separation of fibre bundles.
6. Positively no unbeaten stock bypassed.

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PAPER MILL DIVISION

The MINE and SMELTER SUPPLY COMPANY

Denver, Colorado

Twines
(F. o. b. Mill)

Cotton—			
B. C. 18 basis	.30	@	.32
No. 1	.20	@	.22
No. 2	.19	@	.20
No. 3	.17	@	.18
A. Italian, 18 basis	.36	@	.37
Flaxseed Jute—			
Dark, 18 basis	.18	@	.20
Light, 18 basis	.20	@	.22
Jute Wrapping, 3-6 Ply—			
No. 1	.15½	@	.16½
No. 2	.15	@	.16
Tube Rope—			
4-ply and larger	.09¾	@	.11¾
Fine Tube Rope—			
4-ply	.13¾	@	.14¾
3-ply	.14¾	@	.14¾
2-ply	.15¾	@	.15¾
Paper Makers Twine	.08¾	@	.10¾
Box Twine, 2-3 ply	.12¾	@	.13½
White Hemp	.12¾	@	.15¾
Java Sisal—			
No. 1 Basis	.11½	@	—
No. 2 Basis	.10½	@	—
New Zealand Sisal	.11½	@	—
Sisal Lath Yarn—			
No. 1	.13½	@	.15½
No. 2	.11½	@	.13½
Manila Twine	.24½	@	.29½

CHICAGO

Paper
(F. o. b. Mill)

Bag Bond	.30	@	.53¼
Water Marked Sulphite Bond	.09	@	.12
Sulphite Bond	.04	@	.11
Superfine Writing	.18	@	.24
No. 1 Fine Writing	.14	@	.18
No. 2 Fine Writing	.12	@	.14
No. 3 Fine Writing	.07	@	.18
No. 1 M. F. Book	.06½	@	.07¾
No. 2 M. F. Book	.05¾	@	.06¾
No. 1 S.&S.C. Book	.06¾	@	.07¾
No. 2 S.&S.C. Book	.05¾	@	.06½
Coated Book	.07½	@	.12
Coated Label	.07½	@	.10
No. 1 Manila	.04¾	@	.05¾
No. 1 Fibre	.04¾	@	.05¾
No. 2 Manila	.04¾	@	.04¾
Butcher's Manila	.03¾	@	.03¾
No. 1 Kraft	3.50	@	4.50
Southern Kraft	2.62½	@	—
No. 2 Kraft	2.62½	@	—
Wood Tag Boards	.04¾	@	.06¾
Sulphite Screenings	.03	@	.03½
Manila Tissue	.07	@	.07½
White Tissue	.07¾	@	.07½
(Delivered Central Territory)			
News, per ton—			
Rolls, contract	45.00	@	—
Sheets	50.00	@	—
Boards, per ton—			
Plain Chip	37.50	@	—
Solid News	43.50	@	—
Manila Lined Chip	47.50	@	—
Patent coated	55.00	@	—
Container Lined—			
85 Test	60.00	@	65.00
100 Test	60.00	@	70.00

Old Papers
(F. o. b. Chicago)

Shavings—			
No. 1 White Envelope cuttings	1.70	@	1.80
No. 1 Hard White	1.40	@	1.50
No. 1 Soft White	1.20	@	1.30
Ledger & Writings	.80	@	.90
Solid Books	.80	@	.90
Blanks	1.00	@	1.05
Krafts	.90	@	1.00
New Kraft Cuts	1.20	@	1.30
Manila Env. Cuts	1.25	@	1.30
Ex. No. 1 Manila	1.00	@	1.05
Print Manila	.60	@	.65
Overissue News	.60	@	.70
Old Newspapers—			
No. 1	.55	@	.65
Mixed Papers—			
No. 1	.50	@	.55
Roonng Stocks—			
No. 1	30.00	@	—
No. 2	28.00	@	—

PHILADELPHIA

Paper
(F. o. b. Mill)

Bonds	.04	@	.40
Ledgers	.06	@	.40
Writings—			
Superfine	.10	@	.18
Extra Fine	.15	@	.26
Fine	.15	@	.26
Fine, No. 2	.10	@	.25
Fine No. 3	.05½	@	.18
Book, M. F.	.04¾	@	.07
Book, S. S. & C.	.05	@	.07½
Book, Coated	.06	@	.16
Coated Lithograph	.06	@	.11
Label	.07	@	.11
No. 1 Jute Manila	.06	@	.10
Manila Sul., No. 1	.03	@	.06
Manila No. 2	.03	@	.05
No. 1 Kraft	.05¼	@	.06½
No. 2 Kraft	.03¾	@	.05
Southern Kraft	2.75	@	4.00
Common Bogus	.03	@	.04½
(Delivered Philadelphia)			
News Print Rolls	46.00	@	55.00
Straw Board	40.00	@	45.00
News Board	37.00	@	45.00
Chip Board	40.00	@	45.00
Wood Pulp Board	70.00	@	85.00
Binder Boards—			
No. 1, per ton	75.00	@	80.00
No. 2, per ton	70.00	@	75.00
Carload lots	65.00	@	70.00
Tarred Felts—			
Regular	52.25	@	54.25
Slaters (per roll)	.84	@	.94
Best Tarred, 1-ply (per roll)	1.95	@	2.10
Best Tarred, 2-ply (per roll)	1.50	@	1.60
Best Tarred, 3-ply	2.00	@	2.25

Domestic Rags (New)
(Price to Mill, f. o. b. Phila.)

Shirt Cuttings—			
New White, No. 1	.03½	@	.04
New White, No. 2	.02½	@	.04
Light Silesias	.02½	@	.03
Silesias, No. 1	.03	@	.03½
Black Silesias, soft	.02½	@	.03
New Unbleached	.05	@	.05½
Washable, No. 1	.01½	@	.02
Blue Overall	.03½	@	.04
Cottons—According to grades—			
Washable, No. 2	.02½	@	.03
New Blue	.01½	@	.03
Fancy	.01½	@	.03
New Black Soft	.02	@	.04
New Light Seconds	.01½	@	.02
New Dark Seconds	1.50	@	1.75
Khaki Cuttings—			
No. 1 O.D.	.03	@	.04
No. 2 Mixed	.03	@	.04
Corduroy	.02	@	.03
New Canvas	.03½	@	.04½
New Black Mixed	.02½	@	.03½

Domestic Rags (Old)

White No. 1—			
Repacked	2.50	@	3.50
Miscellaneous	1.75	@	2.25
M. G.	3.00	@	3.75
Thirds and Blues—			
Miscellaneous	1.00	@	1.50
Repacked	1.50	@	2.00
Black Stockings (Export)	2.00	@	3.50
Roofing Stock—			
Foreign No. 1	.50	@	.75
Repacked	.70	@	.85

Bagging
(F. o. b. Phila.)

Gunny, No. 1—			
Foreign	1.25	@	1.50
Domestic	1.50	@	1.75
Manila Rope	2.00	@	2.25
Sisal Rope	1.25	@	1.50
Mixed Rope	1.00	@	1.10
Scrap Burlaps—			
No. 1	1.25	@	1.50
No. 2	.80	@	1.00
Wool Tares, heavy	2.75	@	—
Mixed Strings	1.15	@	1.25
No. 1 New Light Burlap	2.25	@	2.50
New Burlap Cuttings	2.00	@	2.25

Old Papers
(F. o. b. Phila.)

Shavings—			
No. 1 Hard White	2.30	@	2.40
No. 2 Hard White	2.10	@	2.15
No. 1 Soft White	2.00	@	2.10
No. 2 Soft White	1.15	@	1.25
No. 1 Mixed	.95	@	1.00
No. 2 Mixed	.75	@	.80
Solid Ledger Stock	1.50	@	1.60
Writing Paper	1.20	@	1.25
No. 1 Books, heavy	1.20	@	1.25
No. 2 Books, light	.90	@	1.00
No. 1 New Manila	1.65	@	1.75
No. 1 Old Manila	.95	@	1.00
Print Manila	.90	@	.95
Container Manila	.85	@	.90
Old Kraft	1.20	@	1.25
Common Paper	.65	@	.70
No. 1 Mixed Paper	.75	@	.80
Straw Board Chip	.70	@	.75
Binders Board Chip	.70	@	.75
Corrugated Board	.90	@	.95
Overissue News	.75	@	.80
Old Newspaper	.75	@	.80

BOSTON

Paper
(F. o. b. Mill)

Ledgers—			
Sulphite	.06	@	.12½
Rag Content	.12	@	.30
All Rag	.36	@	.52½
Bonds—			
Sulphite	.05½	@	.11
Rag Content	.12	@	.30
All Rag	.36	@	.65
Writings	.06½	@	.20
Superfines	.11	@	.31
Book, Super	.06	@	.09
Book, M. F.	.05½	@	.08½
Book, Coated	.08½	@	.18
Coated Litho	.09	@	.12
Label	.09½	@	.15
Jute Manila No. 1	.11	@	.13
Manila, Sul. No. 1	.04¾	@	.06½
Manila, Sul. No. 2	03¾	@	.04½
No. 1 Kraft	.04½	@	—
No. 2 Kraft	.03½	@	—
(F. o. b. Boston)			
Southern Kraft	.03½	@	—
(F. o. b. destination in carload lots, f. o. b. mill in less than carload lots.)			
Common Bogus	.02	@	.02¼
(Delivered New England points)			
News Print, rolls	44.50	@	—
Straw Board, rolls	.009	@	35.00
Straw Board in Sheets, basis 35s to 70s	—	@	40.00
Filled News Board	45.00	@	50.00
Chip Board	42.50	@	47.00
Chip Board (Creasing)	45.00	@	—
Single Manila Lined Chip	52.50	@	62.50
Single White, Patent Coated News Board—			
Bender	62.50	@	72.50
Wood Pulp Board	70.00	@	75.00
Binder Boards	62.00	@	75.00

Old Papers
(F. o. b. Boston)

Shavings—			
No. 1 Soft White	1.90	@	2.00
No. 1 Old Manila	.50	@	.60
No. 1 Mixed	.90	@	1.00
No. 2 Mixed	.75	@	.80
Solid Ledger Books	1.40	@	1.50
Overissue Ledger Stock	1.15	@	1.30
Mixed Ledgers	1.00	@	1.10
No. 1 Books, heavy	1.10	@	1.20
No. 1 Books, light	.80	@	1.00
Crumpled Stitchless Book Stock	.50	@	.60
Manila Env. Cuttings	1.25	@	1.30
No. 1 Old Manila	1.00	@	1.10
White Blank News	1.20	@	1.30
No. 1 Kraft	1.20	@	1.25
Manila	.90	@	1.05
No. 1 Mixed Papers	.70	@	.77½
Print Manila	.90	@	1.05
Overissue News	.80	@	.90
Old Newspapers	.70	@	.70½
Box Board Chips	.55	@	.65
Corrugated Boxes	.62½	@	.85
Screening wrappers	.75	@	.85

Bagging
(F. o. b. Boston)

Manila Rope—			
Foreign	2.75	@	—
Domestic	2.50	@	—
Transmission Rope	1.50	@	—
Mixed Strings	.85	@	—
Jute Rope	1.00	@	1.15
Jute Carpet Threads	.65	@	.70
Gunny No. 1—			
Foreign	1.35	@	1.45
Domestic	1.25	@	—
Bleachery Burlap	3.00	@	3.25
Scrap Burlap	1.00	@	1.10
No. 1 Scrap Burlap	1.10	@	1.20
Scrap Sisal	1.15	@	1.30
Scrap Sisal for shredding	1.15	@	1.30
Wool Tares, heavy	1.10	@	1.25
New Burlap Cutting	.95	@	1.00
Australian Wool Pouches	2.50	@	—
Heavy Baling Bagging	1.25	@	1.50
Paper Mill Bagging	.85	@	.95
Bagging No. 2	.50	@	.60
No. 1 Burlap	1.75	@	2.25

Domestic Rags (New)
(F. o. b. Boston)

Shirt Cuttings—			
New Light Prints	.02	@	.02¼
New White No. 1	.05½	@	.06
New White No. 2	.04½	@	.05
Silesias No. 1	.04	@	—
New Black Silesias	.02½	@	.03
New Unbleached	.06	@	—
Fancy	—	@	.02½
Washable	.02¼	@	—
Cottons—According to grades—			
Blue Overalls	—	@	.03¾
New Black, soft	.04	@	.04½
Khaki Cuttings	.03	@	.03¼
O. D. Khaki	.03	@	.03¼
Corduroy	.01¼	@	.02
New Canvas	—	@	.05
B.V.D. Cuttings	.04	@	.04½

Domestic Rags (Old)
(F. o. b. Boston)

Canvas	.04½	@	—
White No. 1—			
Repacked	3.00	@	3.50
Miscellaneous	2.00	@	—
White No. 2			
Repacked	.01½	@	.01¾
Miscellaneous	.01½	@	.01¾
Twos and Blues	1.25	@	1.50
Thirds and Blues			
Repacked	1.10	@	1.25
Miscellaneous	.85	@	.90
Black Stockings	2.25	@	2.50
Roofing Stock—			
No. 1	.70	@	.80
No. 2	.60	@	.70
No. 3	.35	@	.45

Foreign Rags
(F. o. b. Boston)

Dark Cottons	.70	@	.80
New White Shirt Cuttings	5.50	@	6.50
Dutch Blues	2.00	@	2.50
New Checks & Blues	2.50	@	3.00
Old Fustians	1.25	@	1.55
Old Linsey Garments	1.05	@	1.25

TORONTO

Paper
(F. o. b. Mill)

Bond—			
No. 1 Sulphite	.09¾	@	—
No. 2 Sulphite	.08	@	—
No. 1 Colored	.10¼	@	—
No. 2 Colored	.08½	@	.10½
Ledgers (sulphite)			
Ledgers, No. 1	.34½	@	—
Ledgers, No. 2	.25½	@	—
Writing	.09	@	.09½
Book—			
No. 1 M. F. (Carloads)	6.20	@	—
No. 3 M. F. (Carloads)	5.70	@	—
No. 4 M. F. (carloads)	4.75	@	—
No. 1 S. C. (carloads)	6.65	@	—
No. 3 S. C. (carloads)	6.20	@	—
No. 4 S. C. (carloads)	5.20	@	—
No. 1 Coated and Litho	12.00	@	—
No. 2 Coated and Litho	10.50	@	—
No. 3 Coated and Litho	9.50	@	—
Coated Litho	14.00	@	—
Wrapping—			
Rag Brown	4.25	@	—
White Wrap	2.00	@	—
"B" Manila	4.75	@	—
No. 1 Manila	5.25	@	—
Fiber	5.25	@	—
Kraft, M. F.	5.75	@	—
Kraft No. 2	5.25	@	—

(F.O.B. Cars Toronto)

News, per ton—			
Rolls (contract)	45.50	@	—
Sheets	50.50	@	—

Pulp
(F. o. b. Mill)

Ground Wood	18.00	@	20.00
Sulphite easy bleaching	40.00	@	—
Sulphite, news grade	38.00	@	—
Sulphite, bleached	45.00	@	50.00
Sulphate	50.00	@	—

Old Waste Paper
(In carload lots, f. o. b. Toronto)

Shavings—			
White Env. Cut	1.80	@	2.00
Soft White	1.40	@	1.80
White Blk. News	1.25	@	1.50
Book and Ledger—			
Flat Magazine and Book Stock (old)	.90	@	1.00
Light and Crumpled Book Stock	.80	@	.90
Ledgers and Writings	1.00	@	1.05
Manilas—			
New Manila Cut	1.25	@	1.50
Printed Manilas	.55	@	.80
Kraft	1.25	@	1.50
News and Scrap—			
Strictly Overissue	.70	@	—
Strictly Folded	.60	@	—
No. 1 Mixed Paper	.55	@	—

Domestic Rags
(Price to mills, f. o. b. Toronto)

No. 1 White Shirt Cuttings	.04¼	@	.04¾
Fancy Shirt Cuttings	.02¼	@	.02½